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Editorial.

THE PROPOSED "ANNUAL FEE."

In the Veterinary Journal for February we threw out a suggestion concerning the proposed annual fee whereby a compromise might be arrived at between those who think the amount of such a fee should be variable and fixed annually, and those who think it should be permanently fixed by Act of Parliament at one guinea. Our suggestion was that the Bill should provide for the imposition of an annual fee of a guinea or half a guinea, the actual amount to be fixed by the Council every five years. A suggestion made by some members of the Council, but opposed by the majority, was that the amount of the fee should be decided annually. It was pointed out that unseemly wrangling at every election would probably result. We cordially agree that such a proceeding would be undignified and most undesirable, and, moreover, we consider the suggestion to be quite unworkable.

In our issue of last month one of our readers makes another suggestion, to the effect that annual fees should be "graduated on the income on the same lines as the income tax." This correspondent points out that, as the draft Bill stands at present, the same fee is asked from the struggling country practitioner whose *gross* income may not exceed £250 a year—and, we may add, the underpaid assistant who is getting a pound or thirty shillings a week—as is asked from the prosperous practitioner with an enormously larger *net* income. There is no doubt much to be said from this standpoint. The veterinary surgeon with smaller interests may be just as jealous to maintain the dignity of his profession as his more fortunate co-practitioner, and perhaps even more so; yet he may be unable to give the same financial support. We readily

admit the justice of our correspondent's suggestion, but unfortunately we do not think it workable. Consider the difficulty of obtaining correct income returns, and the small army of accountants, &c., such a system would entail. No! We are afraid it would be too complicated; but some allowance might, perhaps, be made for small incomes. Bearing that in mind, we might suggest an alternative to our "five years scheme." The annual fee might be fixed by Act of Parliament say, at a guinea a year on incomes of £250 per annum or over, and at half a guinea on all incomes less than that amount. We do not think such a scheme would work as well as our "five years scheme," for nobody likes to expose his private financial affairs to prying eyes.

With regard to the Bill as a whole, it is high time we went ahead. It has been discussed so long that nobody could truthfully say it had been unduly rushed. The Farmers' Societies and agricultural press seem to have discovered a serious menace to their own interests in the clause referring to unqualified and unregistered practitioners, and do not seem to be aware that practically there is little or no alteration in the law as it has stood since 1881. Some of them seem anxious to take away from us even that vestige of control over unqualified persons. The situation appears to be that the people for whose sake we exist are anxious to give the empiric a freer hand and to trample on the existing rights of the veterinary profession. The situation is no doubt due in a large measure to the fact that the profession has been unable through lack of funds to make itself sufficiently important. So long as it is satisfied with its present attitude of "do nothing," it cannot expect better treatment. If the profession do not immediately agree and put their hands in their pockets, the outlook for the Body Corporate is extremely poor, and the individual members will inevitably suffer in the long run.

General Articles.

SOME MORBID CONDITIONS OF THE PHALANGES.[1]

BY W. HUNTING, F.R.C.V.S., LONDON.

It is rather remarkable that so large a proportion of all the articular or osseous lesions affecting horses should be found in the phalangeal region. With the exception of splints and sprains, it is very rare to find either articular or osseous disease above the fetlock. Anyone who has had the opportunity of examining phalangeal bones in a knacker's or bone-boiler's establishment must have been struck with the variety of lesions disclosed. Fractures are tolerably common, and many of them firmly repaired. Bony enlargements are frequently seen, varying from well-marked masses on the suffraginis to little osteophytes on the surface of the coronary and pedal bones. These last bones often show alteration in form from absorption due to continued pressure which has not been sufficient to induce acute inflammation. On the posterior processes of the foot-bone are often to be found roughened surfaces formed of small bony outgrowths which are traceable to the effects of acute bruising, and which probably explain why "corns" that are permitted to exist for a month or two become incurable. The flattening of pedal bones due to absorption of their under-circumferential surface are not now so common as in the time when hoofs were unduly rasped away and horny soles pared till their protecting qualities were damaged. These *post-mortem* specimens found in heaps of unidentified bones lose a great deal of their interest from having no history, but they possess both interest and instructive value when we consider them in relation to similar lesions of which a history can be obtained. The frequency of these lesions in the dead bones, and the discovery of similar changes in cases we have observed and treated during life, help to explain some of the peculiar lamenesses in which diagnosis is difficult or impossible.

I have no doubt that the majority of our undiagnosed lamenesses have their seat in the phalangeal region. There may exist within the hoof such grave conditions as fracture or necrosis of bone, and yet no lameness to attract attention to them. I have seen this in navicular disease, and in some pedal conditions. On the other hand, you may have marked lameness and, during life, no local change pointing to the position of the lesion—none of the classical symptoms of inflammation such as heat, redness or swelling. Pain doubtless we have, but only indicated by objective symptoms which are vague and often delusive. The difficulty of diagnosis in most of the affections of the phalangeal regions is a real obstruction to treatment. Of course many of them in time develop some visible sign of their seat and nature; and we have at our command an agent in cocaine which affords much assistance. An injection of cocaine over the metacarpal nerves will usually enable a diagnosis to be made to some extent. It will remove pain due to any lesion below the middle of the pastern. It will not help when the pain and lameness arise from some morbid change in the fetlock joint or on the head of the os suffraginis. With these general

[1] Read before the Southern Counties Veterinary Society.

remarks I will now briefly notice a few of the phalangeal changes which give rise to lameness.

Fractures.—Fractures of the phalangeal bones may occur from direct external violence, but I only desire now to refer to those which result from the weight of the horse being thrown upon a bone with sufficient force to break it, as when a horse is galloping or prancing, or when a foot is brought violently to the ground by a horse in pain, or from temper. I believe that fractures may occur in a perfectly sound phalangeal bone simply through weight being imposed upon it when it is in an unfavourable position to meet it. When, for instance, a horse is galloping over uneven ground, and the muscles fail to act in co-ordination, so that weight is transmitted from the bones above to one below in a fixed position on the ground, and in a position which offers no opportunity for the dissemination of the force through it to the other tissues. A horse excited may rear and prance, bringing a foot to the ground violently, and probably with the pastern too straight, and cause a comminuted fracture of the bone. A bone becomes predisposed to fracture when its normal qualities are altered by inflammation. After neurectomy fractures occur which are directly traceable to disease of the bone. Neurectomy performed to remove the pain resulting from navicular disease has often been followed by fracture of the navicular bone. Median neurectomy, performed for lameness due to osteo-arthritis of the fetlock joint, has frequently had for its sequel fracture of the suffraginis; and now that median neurectomy has come to be more widely used we have even fracture of the metacarpal bones—the bones being, I believe, altered in quality by inflammation accompanying extensive splints.

Diagnosis.—The diagnosis of fracture of a phalangeal bone is certain when crepitus can be detected, but it is very uncertain when no displacement accompanies the injury. Fractures of the suffraginis may be comminuted, they may extend to only one or more fissures, they may consist of a split that only extends partly through a bone, and they may be merely little chips from the outer edge of the articular surface. The partial fractures and the small "chip" fractures cause no swelling, although much lameness, and are difficult to diagnose. Sometimes we may detect one spot at which pressure gives rise to signs of acute pain, and with the history of the case this may enable us to arrive at a conclusion.

As a rule, fracture of the bones within the hoof affords no symptom other than excessive lameness to guide us, and we have thus to trust to a negative diagnosis based upon failure to find any other lesion which would account for lameness. My own experience teaches me that diagnosis of fracture within the hoof is so difficult and uncertain as not to warrant a hasty order for slaughter. Like other bones, the pedal may be predisposed to fracture by disease. I remember a case of a cankered foot in which the whole sensitive sole was denuded of horn and covered with the disease. This horse was at the forge having the foot dressed. He suddenly snatched his foot from the farrier and brought it down violently upon the stone-paved floor. Excessive lameness followed immediately, and a *post-mortem* examination disclosed a vertical fracture right through the bone. I am inclined to think that this fracture would not have resulted had not the bone been softened by the long-continued disease. Fracture of

the navicular bone has often puzzled practitioners, and I know no direct symptom by which it may be diagnosed. I have, when I suspected it, carefully tried pressure in the heel and on the back of the tendon, but without getting a reaction to guide me; and I have afterwards discovered the lesion *post-mortem*.

Inflammation.—Perhaps the most interesting morbid conditions of the phalanges are those in which the bones and joints are the seat of disease. We have periostitis, ostitis, and osteo-arthritis. The effects of periostitis are frequently visible in the shape of bony enlargements on the suffraginis or corona (false ringbone). The effects of ostitis are best shown perhaps in "cab-horse disease" and navicular disease, whilst osteo-arthritis is found when the inflammation of the bone extends to the articular surfaces. It is rather curious that in most cases of osteo-arthritis affect the concave articular surface — in phalangeal disease the upper end of a bone. Just in passing I may add that this selection for attack of the concave rather than the convex surface of an articulation is seen in joints of the upper part of the limbs even when the concavity is found in the upper bone of the joint—as for instance, in the hip-joint. Of course, both surfaces of a joint are affected and almost symmetrically when arthritis has proceeded so far as to cause ulceration or necrosis. Another osteo-arthritic condition is found in what has been called Pyramidal disease.

From the course of lameness induced and from the similarity of symptoms and lesions, I incline to believe that these inflammations of bone in the phalangeal region are all so analogous that we may draw conclusions from each that are applicable to all. In the so-called "cab-horse disease," of which I produce specimens, the most conspicuous lesion is a bony enlargement on the inner side of the head of the os suffraginis. But this is really a late development of the disease, and lameness has existed for weeks or months previous to the appearance of any enlargement on the inner side of the lower surface of the fetlock joint. This form of lameness is not easily diagnosed. No heat, pain or swelling about the fetlock or pastern is evident. Perhaps the most suggestive symptom is that the horse goes out sound, and after an hour's work is so lame that he can hardly be walked home again, and that next morning no lameness is visible. This sort of thing is repeated a few times, and then the lameness becomes more lasting, and ultimately an enlargement appears on the inside of the lower part of the fetlock joint. The lameness preceding enlargement is doubtless due to ostitis going on in the suffraginis, and gradually the inflammation spreads to the outer surface and sets up periostitis. But it also spreads towards the articular surface, and we never find the enlargement due to periostitis without also finding on *post mortem* some changes in the articular surface.

In navicular disease a similar sequence of changes occurs. First lameness, and if a *post mortem* very little to be seen. When lameness is continued for some time changes may be found in the surface of the bone. The change is not always necrosis—it may be only a thin line of ossific matter, and therefore we conclude that ostitis has been in existence before any articular mischief developed. In some cases no change is found in the synovial bursa, and no change in the surface of the bone, but changes are visible when the bone itself is sawn in two,

and hardly ever is a case of long-standing navicular disease found without some periostic formations on the bone. Now, if the symptoms of cab-horse disease and navicular disease are more or less analogous, and the pathological lesion the same, I venture to say that similar conditions in the other phalangeal bones and joints proceed on much the same lines, and that an ostitis is the initial change which accounts for all of them.

Between the suffraginis and the corona we have morbid changes similar to those found in the navicular and fetlock joints. We have periostitis giving rise to bony enlargements not implicating the joints, and we have bony enlargements which do implicate the joints. In the case of those exostoses which do not cause anchylosis of the joint, my experience is that very seldom is the articular surface affected. In the case of those exostoses which surround and fix the joint, I have not yet seen a case in which the articular surface has not been the seat of inflammatory changes—softening, ulceration, and necrosis—conditions which I believe proceed from a primary ostitis of the bone. On the contrary, when I find even large exostoses on the suffraginis not implicating the joints, I never find articular destructive changes. I believe that the non-articular enlargements are due to a primary periostitis, probably set up by strain on the bone at the point where large ligaments and tendons are inserted, and not to concussion. Those pathological conditions in which the joint is implicated, and which I believe are due to an initial ostitis, are due to the direct excitement of concussion with a predisposition from heredity. I have not used the term ringbone in speaking of these two conditions—one evidenced by exostosis without articular change, the other always consisting of bony enlargement and articular disease. It may possibly make the statement of my idea more lucid if I say that the articular mischief is usually described as true ringbone and the mere periostitis as false ringbone. If I am not wrong in my conclusions the two conditions are very different and should not be spoken of under one term. I deprecate the use of the words "true" and "false" in connection with ringbone or any other morbid condition. Conditions so described may present some similarities, but are really different things, and I desire to confine the word "ringbone" to an articular disease which causes lameness and is incurable, while the exostoses on a bone are not always incurable, although they may cause prolonged lameness.

As to the cause of these ossific and arthritic changes in the phalangeal region there are two theories. One supposes them to be due to primary sprain of the ligamentous structures, the other to an initial inflammation of the bones. I admit that both are arguable, but I submit that the weight of evidence is in favour of ostitis due to concussion being the cause of all those conditions in which articular mischief is found. The exostoses not implicating joints are probably due to tension on the periosteum or the bone by ligaments and tendons. So far as I know all the exostoses commence at parts where fibrous tissues are attached to bone—notably to the lower external surfaces of the os suffraginis. The joint most frequently affected in ringbone is the coronary, but the pedal joint may also suffer. As the pedal joint is within the hoof the pain is greater than when the joint above is the seat of the change. Again the lameness from the two

different sites differs somewhat, as the coronary joint is one possessing very little movement, whilst the pedal joint naturally has a good deal of motion. If it were not that in both cases the articular surfaces undergo destructive changes, we should say that a high ringbone—connecting the suffraginis and coronary bones—would be a less serious condition than the low ringbone which affects the coronary and pedal bones. They are both bad, but that affecting the lower joint is the worst. These conditions are pathologically interesting, but they are also of importance in veterinary practice from a medico-legal aspect. They often are problems for consideration before giving an opinion on soundness, and they are the subject of controversy in law courts when prosecutions for cruelty follow the working of horses suffering from them.

Is a ringbone unsoundness? About this none of us differ. It is a gross unsoundness. Is the so-called "false" ringbone unsoundness? Here opinions may differ. Some horses show well-marked bony enlargements on the pastern bones, and where the exostoses are alike on all four pasterns I believe they should not be classed as unsoundness. Of course, if they give rise to lameness they are an unsoundness, and even if they are likely to cause lameness they must legally be acknowledged as unsoundness. When only one swelling is present, or when that is abnormally large, it is an unsoundness, but when on both limbs or on all four we find enlargements of the pastern about the same size and shape, I conclude that they are not dangerous, and should not encourage us to advise against purchase. Then in cases of cruelty we have often differences of opinion as to the amount of pain accompanying lameness, or, it may be, the duration or constancy of the pain. In articular disease—true ringbone—I believe there is always incurable disease of the joint surfaces, and therefore always pain. Such cases are continuously unfit for work. In the case of exostoses not implicating a joint, lameness is intermittent, and produces pain in proportion to the periostitis going on. Except in the most pronounced cases it is safe to say that pain is not continuous, and that the lameness is not of the most acute nature—that it varies according to the work done, and may arise to-day in a horse that was not lame yesterday, although presenting a well-marked bony enlargement.

(*Veterinary Record.*)

ACUTE HÆMOGLOBINURIA OR AZOTURIA IN THE HORSE.[1]

BY JOHN MCCALL, M.R.C.V.S., PROFESSOR IN THE VETERINARY COLLEGE, GLASGOW.

Definition.—This disease is an acute auto-poisoning occurring in plethoric horses on being subjected to active exertion after a period of idleness, and manifested by great nervous excitement and prostration, loss of power in the hind limbs, and passage of hæmoglobin in the urine.

Nature and Causes.—The most varied conclusions as to the nature of the disease have been put forward by different authors. In England,

[1] Read before the South Durham and North Yorkshire Veterinary Association.

Haycock called it hysteria, supposing it was confined to mares; and Williams attributed it to uræmic poisoning, although this was contra-indicated by the sudden onset of the disease. In France it has been attributed to a spinal myelitis, because of the disturbed innervation of the posterior extremities, but this has not been supported on microscopic examination of the cord. In Germany, veterinarians have also viewed the disease from widely different standpoints, classifying it as rheumatic lumbago, myelo-renal congestion, &c. Diekerhoff regards it as a parenchymatous inflammation of certain muscles, accompanied by acute nephritis and hæmoglobinuria, and a bloody infiltration of the bone-marrow; and he attributes the attack to cold. This latter conclusion is certainly not borne out in this country, where the disease undoubtedly occurs during both cold winter and hot summer weather, and if cold were the chief factor in its production we would expect to see the disease not when the animal was being actively exercised, but when at rest. Probably this conclusion is based on the fact that winter hæmoglobinuria is occasionally seen in the human subject when exposed to an extremely low temperature.

Although many of these causes already mentioned may undoubtedly play a subordinate part in the production of this malady, there can be no question that a period of rest is a constant precursor of an attack; the horse that is kept at daily, steady work may be said to be practically exempt. All of us who have had practical acquaintance with the disease know that it is mostly seen in the previously healthy horse that has suddenly been put off work owing to lameness, stormy weather, impassable roads, or at the holiday season. Personally, I have rarely seen it except in horses that were in extra good condition and robust health, and quite a number of cases have been in imported American horses that had become acclimatized and were rapidly putting on flesh.

It is held that the attack comes only in the animal that is heavily fed on a strongly nitrogenous ration, but this is subject to exception, for while I admit that such conditions are certainly more favourable for its production, yet occasionally we meet with the malady in animals receiving quite a moderate diet, but which are apparently capable of fully assimilating what they do get. Still another theory is the muscular theory, which regards the pigment found in solution in the blood-plasma and excreted by the kidneys as colouring matter set free from the muscular fibres by the agency of some ferment, and hence the muscular lesions are here regarded as the primary factor; but we are given no knowledge of what the ferment is or where it is produced.

The last thing which I purpose discussing is termed the *hæmal* or *blood theory*. It ascribes the pigment found in the blood-plasma and the urine as being due to the destruction of the red blood-corpuscles in the circulation, and their liberated pigment becoming arrested in the capillaries, causing embolism; this would account for the cramp-like symptoms in the extremities and the naked-eye and microscopic appearances of the affected muscles, hence we see, according to this view of the disease, the muscular lesions are regarded as not primary, but secondary; but here again the precise cause of this destruction of the red blood-corpuscles is unexplained.

On first impression we would expect, if this were the case, to find, on microscopic examination of the blood of an animal affected with the disease, a deficiency in the number of red blood-corpuscles, but this

has not been demonstrated; still, who is able to affirm that the number of red blood-corpuscles were not in excess *just before the attack*, and consequently during the attack the number have been reduced to the normal? We assume that the normal life of red blood-corpuscles is a very short one; further, that muscular activity destroys them, and hence it needs no great stretch of imagination to believe that during a period of rest the red blood-corpuscles may be formed greatly in excess of the demand, and that the symptoms produced in the animal when put to muscular exertion are Nature's method of restoring the balance.

A blood abnormally rich in albuminoids as it is in the *temporary plethora* induced by a short period of rest in the vigorous work horse, without any marked restriction in his diet, may therefore be put down as one of the primary factors in the production of hæmoglobinuria, and this is not without its approximate example in human pathology. It has been shown that hæmatogenous albuminuria will occur in healthy individuals when there is an excess of albumen in the blood-plasma or after a too free use of albuminoid foods.

Lesions.—The blood strongly resembles that of anthrax, being dark-coloured and slightly coagulable, and forms a soft clot; while the serum, instead of being amber-coloured, is frequently reddish from the presence of the hæmoglobin pigment. Microscopically the red corpuscles may be altered in shape.

The liver and spleen are swollen and congested, the former being friable and mottled.

The lumbar and gluteal muscles are usually affected. On section they have a pale, macerated appearance, and show numerous hæmorrhages in their substance.

Microscopically they are found to be the seat of a rapid degeneration, their fibres having lost their cross striation and assumed instead a granular or hyaline appearance.

The red bone-marrow of the limbs is often extensively congested, and in some acute cases this extends to the yellow bone-marrow.

The kidneys may be quite normal, but sometimes we get congestion and hæmorrhagic infarction, or even degeneration of the renal epithelium, if the patient has survived for a few days.

The spinal cord may show near its termination some congestion, and be surrounded by an exudate.

Symptoms.—These vary in intensity according to whether the case is acute or not; usually the animal has not gone far (perhaps half a mile) until the driver notices a peculiar stiffness and want of power behind, the horse flags, and if driven on he staggers and may eventually fall, being unable to rise, he trembles violently, sweats profusely, and if still able to stand knuckles over at the fetlocks and crouches down on his hind limbs. The heart palpitates violently, and respiration is laboured, although the temperature remains practically normal. On examination we find the muscles over the croup hard and contracted, but I have never seen them distinctly swollen, as is commonly recorded. As a rule, when the patient is unable to rise he is also unable to micturate, probably owing to spasm of the sphincter muscle.

The urine when removed with the catheter may vary in colour from reddish grey to deep port wine colour; it contains large quantities of

albumen, urea, hæmoglobin, and other waste products. It does not contain blood-corpuscles or renal epithelium unless there is present nephritis in addition. In very acute cases death frequently results in twelve to twenty-four hours, and closely resembles death from acute tetanus.

The mild cases show muscular weakness in the hind limbs; occasionally only one may be affected, and in this case the affected limb bends under the horse when weight is put on it. We observe the same sweating, increased respiration, and great nervous excitement as in the acute, but the erect position is maintained, and with assistance he may safely regain the stable, the urine as a rule being much less highly coloured than in the acute attack, and as recovery proceeds it generally shades back to the normal. One attack undoubtedly predisposes to another under similar conditions, but it is very exceptionally that we meet with such a case as was recently reported in the *Veterinary Record*, in which the animal had repeated attacks after the shortest periods of rest.

Diagnosis.—When the disease attacks a horse in the street it may be mistaken for a severe injury, or injured back caused by a fall, but the history is here of great assistance, and the appearance of the urine is typical.

Prevention.—It is essential that the hard-worked and well-fed horse must not be allowed to remain at rest for any length of time; he should be exercised daily. When from any cause rest is imperative the diet must be materially reduced and should be of a laxative nature, and plenty of water should be allowed.

Treatment.—If the subject be stopped instantly on the appearance of the first symptoms, the disease may be cut short; he should be kept at rest till the acute symptoms pass off, and then walked slowly to the stable. In the event of the patient being already down and unable to rise, he may be removed in a float to the stable and then placed in slings, if he has sufficient power to support himself with their aid; however, if he has lost the power of his hind limbs he is much better lying comfortably in a well-bedded loose-box than hanging in slings, because this only increases the nervous excitement, the pressure on the chest interfering with respiration and aggravating matters.

This is one of the few conditions in which bleeding is strongly indicated, and more especially where the nervous excitement and dyspnœa are great and the heart's action laboured this will speedily relieve the blood-pressure and remove a quantity of the poison from the already overloaded system.

In some cases a full dose of nitric ether is useful, probably acting as a cardiac stimulant and securing the prompt eliminating action of the kidneys.

If the excitement is very great, sedatives may be administered. The patient should be encouraged to drink as much water as possible, so as to dilute the blood and rouse the activity of the kidneys. Where there is no thirst, salt solution may be injected into the rectum.

Hot fomentations over the loins and quarters undoubtedly help to relieve the muscular spasms, and should be continued for several hours.

We should next direct our attention to overcome the loaded condition of the portal circulation, and aloes (dissolved), podophyllin, and eserine are here indicated; the rectum should be emptied, and injections of soap or glycerine and water given at intervals.

In cases where the free action of the bowels is speedily attained the results are more satisfactory.

The catheter should be passed at intervals, and care taken that the instrument is carefully disinfected before using, as not infrequently cystitis, or even more serious urinary trouble, is traceable to infections from a dirty catheter.

During recovery, and for some time thereafter, the diet should be laxative and non-stimulating, linseed gruel, bran, turnips, carrots, and green food mixed with hay if the season permits, and care should be taken that the bowels remain relaxed, alkaline salts, sodium hyposulphite, and potassium chlorate being useful.

Frequently the most troublesome feature in connection with the after-treatment of this disease is the marked wasting and great weakness of the affected muscles which persist, but even in very extreme cases it is wonderful what time and gentle exercise will do to restore the wasted tissues. Provided the attack occurs during the summer excellent results may be obtained by applying a smart blister over the region of the wasted muscles and turning the patient out to grass, although it may take many months before he is restored to usefulness. Electric treatment has also been employed with success concurrently with the internal administration of strychnine.

SOME COMMON DISINFECTANTS.

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Introduction.

There is much popular misconception as to the value and limitations of the various disinfectants which are sold in this country. For this reason the following very brief description of some of the more common of them has been prepared. Full and complete descriptions of these substances may be found in the very excellent treatises of Rosenau,[1] Rideal,[2] and others.

Formaldehyde.

Formaldehyde—formic aldehyde—is available on the market as paraform (a sort of condensed formaldehyde, which is sold as a white powder or in the form of pastils) and also in aqueous solution generally known under the name of formalin. The solution is supposed to contain 40 per cent. of formaldehyde, though in reality the amount of formaldehyde present rarely exceeds 37 to 38 per cent. Formaldehyde may be used for disinfection in either a liquid or gaseous form.

Liquid Formaldehyde.—Solutions of formaldehyde are best prepared by making a 5 per cent. solution of formalin in water. This is

[1] "Disinfection and Disinfectants." Philadelphia, 1902.

[2] "Disinfection and the Preservation of Food." New York, 1903.

applied directly to substances that require disinfection, and in the case of refuse, excreta, and similar substances should be thoroughly mixed with them. A 5 per cent. solution of formalin is generally regarded as superior to carbolic acid of the same strength as a general disinfectant.

Gaseous Formaldehyde.—In disinfecting with formaldehyde gas it is essential that the compartments to be disinfected be tightly closed so that a sufficient concentration of the gas may be held in contact with the infected substances a sufficient length of time. The temperature of the air is an important factor in securing efficient action, the formaldehyde being much more energetic in a warm atmosphere than in a cold. The best authorities state that gaseous formaldehyde disinfection should not be attempted if the temperature of the air is below 50° F. The gas is most conveniently secured by liberating it from the concentrated aqueous 40 per cent. solution or from the solid paraform. A number of methods for accomplishing this in practice have been devised, the more important of these being as follows :—

Production of the Gas from Formalin.—(*a*) *Heating under Pressure.*—Portable autoclaves specially designed for the purpose are charged with a sufficient amount of formalin, the quantity depending upon the cubic air space to be disinfected. The autoclave is closed, and heat is applied until the required pressure within the autoclave is attained. The gas which has been liberated from the solution by the heat is allowed to flow through an outlet tube into the closed chamber which is to be disinfected. The room is then kept closed for from two to twelve hours; the shorter time if only smooth surfaces are to be acted upon ; the longer if penetration into fabrics is desired. Ten ounces of formalin should be used for each 1,000 cubic ft. of air space.

(*b*) *Heating without Pressure.*—This method is similar to that just described. Formalin is placed in a specially designed retort, and heated with a lamp. The gas is conducted into the compartment to be disinfected by means of a small tube which passes through the keyhole, or other small aperture. Ten ounces of formalin is required for each 1,000 cubic ft. of space. The evolution of gas by this method is less rapid than when generated uuder pressure, and a longer time is required for disinfection. The compartment should remain closed for at least six hours, and for twelve hours if penetration into the interior of labrics, hay, &c., is required.

(*c*) *Spraying.*—In this method the formalin is sprayed upon the surface of objects which require disinfection, or upon sheets which are hung up in the compartment containing the infected materials. The gas is liberated by simple evaporation, this liberation being favoured by the wide surface which is exposed. The gas is liberated much more slowly by this method than by either of those already described, and the diffusion is also relatively much slower. For these reasons the compartment to be disinfected should not be very large, and should remain closed for at least twenty-four hours. Not less than 10 oz. of formalin should be used for each 1,000 cubic ft. of space.

(*d*) *Liberation of the Gas by Chemical Means.*—Several methods of liberating formaldehyde from formalin solutions without the use of artificial heat have been proposed in recent years. The most important of these is known as the "permanganate method." Formalin is poured upon crystallized or powdered potassium permanganate. A violent chemical reaction takes place immediately, heat is generated,

and a rapid liberation of formaldehyde gas takes place. As will be understood, the heat is caused by the reaction between the formaldehyde in solution and the permanganate, a large portion of the formaldehyde being consumed by the reaction. The amount of gas evolved depends in great measure upon the relative weights of permanganate and formalin employed. Experiments have shown that when the formalin and permanganate are mixed in the proportion of 6 parts of formalin to 5 parts of chemically pure permanganate, by weight, 50 per cent. of the formaldehyde employed is liberated in the form of gas. If 10 oz. of formalin be required for disinfection of 1,000 cubic ft. of space by the first three methods described, twice that amount is necessary when the permanganate method is employed, as half of the formaldehyde is destroyed by the reaction. For disinfocting 1,000 cubic ft., therefore, use 20 oz. of formalin and 16⅔ oz. of permanganate. The needle-shaped crystals of potassium permanganate should be employed. Place the required amount of permanganate in a wide-bottomed vessel (an ordinary dish pan is excellent) and pour the formalin on quickly, then close the compartment for from six to twelve hours, depending upon the character of the materials to be disinfected.

Production of the Gas from Paraform and from Wood Alcohol.—(*a*) *Heating Paraform.*—Lamps provided with a pan for holding the paraform are obtainable on the market. The paraform is placed in the pan and heat applied by means of an alcohol lamp. The evolution of gas in this manner is slow. Two oz. of paraform is required for the disinfection of 1,000 cubic ft. of space, and the compartment should remain closed for at least twelve hours. This method is best suited to the disinfection of small spaces.

(*b*) *Generation of Formaldehyde from Wood Alcohol.*—Formaldehyde is readily produced by the oxidation of wood alcohol (methyl alcohol). This fact has been taken advantage of for use in practical disinfection. Lamps have been designed by means of which the vapour of wood alcohol is passed over hot, finely divided platinum. This causes the oxidation of the alcohol to formaldehyde, which is given off in the room to be disinfected. There is somewhat more danger from fire when this method is employed than in those previously described. Not less than 25 oz. of wood alcohol should be employed for disinfecting 1,000 ft. of space.

Advantages and Disadvantages of Formaldehyde.—The advantages may be summarized as follows:—

(1) It is one of the most powerful germicides known.

(2) Its action is not interfered with by albuminous substances.

(3) It is not poisonous, and may therefore be used for disinfecting hay and grain without destroying these for food purposes.

(4) It is not injurious to delicate fabrics, paint, or metals. (Formalin solutions will attack iron, but not other metals.)

The disadvantages are, briefly, as below:—

(1) The gas has a strong tendency to condense in cold weather, and is not reliable as a disinfectant when the air temperature is below 50° F.

(2) It is necessary to seal tightly all compartments which are to be disinfected with the gas, in order that penetration may be secured, and that the required concentration may be maintained for a sufficient length of time.

Carbolic Acid (Phenol).

Pure carbolic acid is solid at ordinary temperatures, and crystallizes in long white needles. It may be purchased in this form or as liquefied carbolic acid. The latter form is prepared by adding 1 part of water to 9 parts of the crystals, and is employed by pharmacists on account of convenience in dispensing. Carbolic acid must not be confused with "crude carbolic acid" and "liquid carbolic acid," which are described below.

For disinfecting purposes carbolic acid is generally used in watery solution, though powders containing it are sold. A 5 per cent. solution of crystallized carbolic acid in water is recommended for general use, for, although weaker solutions have been found efficient for destroying many non-spore-bearing bacteria, the conditions found in practice vary widely, and in some cases hinder the action of the disinfectant. As carbolic acid dissolves slowly, the 5 per cent. solution should be prepared with warm water, using care to see that all is dissolved before use. For disinfecting large surfaces a spray may be used, and the disinfectant should be applied liberally. Garments or implements to be disinfected should remain in the 5 per cent. solution for at least one hour.

Advantages and Disadvantages of Carbolic Acid.—The advantages are:—

(1) It is reasonably effective for destroying non-spore-bearing bacteria.

(2) Its action is only slightly interfered with by albuminous substances.

(3) It does not destroy metals or fabrics in a 5 per cent. solution.

(4) It is readily available at all pharmacies.

The following disadvantages may be mentioned:—

(1) It cannot be depended upon to destroy the spores of such bacteria as anthrax and malignant œdema.

(2) It is expensive (the pure phenol costs approximately 75 cents per pound).

Crude Carbolic Acid.

Probably no substance is so widely used in this country as a household and farm disinfectant as crude carbolic acid, and at the same time there is probably no disinfectant that is so uncertain in its effect if used without a proper understanding of its nature. The commercial crude carbolic acid is one of the products of coal-tar distillation, and consists essentially of a mixture of coal-tar oils and so-called "cresylic acid" with little or no phenol. The oils are practically inert as disinfectants, but the cresylic acid, which is a mixture of cresols and similar homologues of carbolic acid, has very marked disinfecting power.

As crude carbolic acid depends almost exclusively upon the cresylic acid which it contains for its disinfecting power, it should not be employed unless the cresylic acid content is definitely known. Even then it must be regarded as of doubtful efficiency if the percentage of hydrocarbon oils is relatively very large, for the oil will prevent to a great extent the solution of the cresylic acid in water when this is mixed with the crude carbolic acid for use as a disinfectant. As is stated in the paragraph dealing with cresol, the cresylic acid is used

in 2 per cent. solution in water as a disinfectant. When crude carbolic acid is employed, the amount of "acid" which it contains should be known, and the disinfecting solution should be made of such strength that it will contain 2 per cent. of cresylic acid. This disinfecting solution or mixture is best applied by means of a spray pump, and while spraying the mixture should be well agitated in order that the oils containing undissolved cresols may be evenly distributed over the surface to be disinfected.

There are found on the market products which are sold as "liquid carbolic acid," "straw-coloured carbolic acid," &c.; these, as a rule, contain from 90 to 98 per cent. of cresylic acid, and very little coal-tar oil. They are considered in the next section, dealing with cresols.

Cresol.

Cresol (tricresol, straw-coloured carbolic acid, liquid carbolic acid) is derived from coal-tar, and is found in the trade in varying degrees of purity. The cresol of the United States Pharmacopœia is a colourless liquid, having a strong odour resembling that of carbolic acid. It consists of a mixture of three closely related bodies, all of which are superior to carbolic acid as disinfectants. The other grades of cresols usually contain a small percentage of impurities, and are sold as "liquid carbolic acid, 95 per cent.," "straw-coloured carbolic acid," &c. These usually contain from 90 to 98 per cent. of cresol, and may be purchased under a guarantee to contain certain definite amounts of cresylic acid. Grades containing less than 90 per cent. of cresylic acid are not so desirable as those of a higher degree of purity, as the coal-tar oils which are usually found in such products interfere with the solution of the cresols in water, as already stated.

The commercial cresols guaranteed to contain more than 90 per cent. of cresylic acid are relatively cheap, and well suited to the disinfection of cars, barns, and yards. For general disinfection a 1½ to 2 per cent. solution of cresol in water should be used, allowance being made for the impurities when the cheaper grades are employed. Cresol is not easily soluble in water; therefore in preparing solutions, warm water should be used and care taken to see that all is dissolved before applying the solution. A 2 per cent. solution of cresol is regarded as being a more efficient disinfectant than a 5 per cent. solution of carbolic acid, and should be applied in the same way.

are:—

Advantages and Disadvantages of Cresol.—Briefly, the advantages

(1) A 2 per cent. solution of cresol is as efficient as a 5 per cent. solution of carbolic acid.

(2) It is not interfered with by albuminous substances.

(3) It is cheaper than carbolic acid.

(4) It does not destroy metals or fabrics in a 2 per cent. solution.

(5) It is more effective than carbolic acid for destroying spores of bacteria, such as anthrax.

The main drawback to the use of cresol is that it is not readily soluble in water, hence may be used in too weak solution unless great care is taken in the preparation of the solution.

Compound Solution of Cresol.—This preparation, known as "Liquor" cresolis compositus, United States Pharmacopœia, is recognized as official by the last edition of the United States Pharmacopœia, and

is a mixture of equal parts of cresol (U.S.P.) with a linseed-oil-potash soap. The mixture is a thick, dark, amber-coloured fluid, which mixes readily with water in all proportions to form a clear soapy solution. A very efficient disinfectant may be made from the commercial cresols or liquid carbolic acids of known strength by mixing these with the soap described in the United States Pharmacopœia, under the heading "Liquor cresolis compositus." When other than "United States Pharmacopœia" cresol is used, a sufficient excess must be added to insure 50 per cent. of actual cresylic acid in the mixture. Compound solution of cresol is recommended for use as a general disinfectant in a 3 to 4 per cent. solution in water. In this strength it will accomplish the same results as a 1½ to 2 per cent. solution of cresol, and may be applied in the same manner as a 5 per cent. solution of carbolic acid.

It may be said in favour of the compound solution of cresol that it possesses all the advantages of cresol, and, in addition, is far more readily soluble. It is, however, somewhat more expensive than cresol, owing to a stronger solution being required; this is in great measure compensated for by its ready solubility.

Chlorinated Lime (Chloride of Lime).

This substance is prepared by exposing slaked lime to the action of chlorine gas. It is a white powder which gives off a disagreeable odour of chlorine, and decomposes rapidly upon exposure to air. It cannot be depended upon unless kept in hermetically sealed containers. It is prepared for use in the general disinfection of cars, pens, or refuse by mixing 6 oz. with a gallon of water. This is applied liberally, and infectious excreta must be mixed thoroughly with the solution to insure disinfection. Chlorinated lime is a powerful deodorant, and is valuable for use in foul-smelling cesspools and similar places.

As a disinfectant, chlorinated lime possesses no advantages over formaldehyde, carbolic acid, cresol, &c. It has, moreover, certain disadvantages, chief among which are uncertainty of strength and destructiveness to metals and fabrics.

Bichloride of Mercury.

This is a white crystalline substance which is also known as mercuric chloride and corrosive sublimate. It is usually prepared for use in the form of tablets with ammonium chloride, which facilitates the solution of the bichloride in water. The bichloride is used in solution in water in a strength of 1 to 1,000, though solutions 1 to 500 may be employed with correspondingly quicker action on non-spore-bearing bacteria and much more effective action on the spores of bacteria. Bichloride of mercury is a violent poison, and has the property of combining with albuminoids to form inert compounds. These facts necessarily limit its usefulness as a general disinfectant. It should never be used to disinfect excreta, or substances containing blood or serous fluids. Bichloride solutions should not be kept in lead or tin vessels, or poured through lead pipes, as the mercury combines with these metals and injures them, besides affecting the germicidal efficiency of the solution itself.

The chief advantage in the use of bichloride of mercury lies in its great germicidal power when employed under proper conditions. The disadvantages are its poisonous nature, its tendency to attack certain metals, and the interference by albuminoids and other organic substances.

(*Farmers' Bulletin*, 345.)

"BLAIN"—A FORM OF URTICARIA IN BOVINES.

BY S. J. MOTTON, M.R.C.V.S., ROYAL VETERINARY COLLEGE, LONDON.

THE term "blain" is used loosely, and it therefore conveys to the minds of different practitioners somewhat different meanings. Some are disposed to regard it as being more imaginary than real; others associate it with so-called gloss-anthrax, while in Devon the condition which goes under this name is characterized by a swelling which appears at the base of the tongue.

While assisting Mr. Martin, M.R.C.V.S., Wellington, Salop, in 1907, I came in contact with cases known locally as blain, which differ from those referred to above. Blain as it occurs in Shropshire is a form of urticaria. It does not, however, fall quite in line with Law's definition of urticaria, viz., "a mild congestion and exudation into the skin in the form of circumscribed, rounded elevations; it may be symmetrical, often becoming confluent, resembling that caused by stinging with nettles, appearing and disappearing very suddenly, excited by local irritation or auto-poisoning, acting on a specially susceptible nervous system and skin." Circumscribed elevations are not usually seen in blain, but, instead, large areas (with no distinct margin) are affected. Probably bovines of all ages are susceptible, but young animals are most often affected. The disease evinces itself under a variety of conditions, and its actual cause is usually not discoverable. It occurs sporadically, and it is not the rule to find more than one animal attacked. Frequently the affected beast has been subjected to no change, either in diet or mode of life, while in some cases it has been excited by driving over roads, has been exposed to cold, or the patient may be a newly calved cow.

The urticaria observed in swine—the so-called "diamond" disease—is often associated with swine erysipelas, and Lorenz, Jensen, Schütz, and others have found swine erysipelas bacilli in the skin. Mohler, however, asserts that urticaria has never been found associated with the erysipelas bacillus in the United States, and furthermore that swine erysipelas does not exist there. We may take it that by no means all cases of urticaria in swine are caused by the swine erysipelas bacillus. The consumption of certain foodstuffs, and particularly those which have undergone fermentation, have been frequently of blamed as a cause. We are therefore justified in suspecting that blain in cattle may arise from the absorption of some toxic material ingested as such, or formed during the process of alimentation, although, as far as one knows, no attempt has been made to investigate the disease from a bacteriological standpoint.

The first case which claimed my attention was in a yearling which, when being driven along the road, became suddenly ill. Rigors,

noisy breathing, and slight tympany were observed. The eyelids were swollen and almost closed, the skin on each side of the neck became thickened, and pitted on pressure. Œdema was present in the perineal region, and the skin here also pitted on pressure. Seven or eight hours later there was marked improvement, and next day the animal had practically recovered.

Following this several other cases occurred at other places. One of them was a cow with her first calf, a few days old, by her side. The cow had cleansed well, and until the onset of the attack she appeared to be in perfect health. She was turned into a field on a rather cold May morning, and soon after was observed to be trembling. As in the previous case, the eyelids, skin of the neck, and perineum were œdematous. The œdema was very well marked in the vulval labiæ, and the skin covering the udder was similarly affected. Her coat stared, and the secretion of milk had diminished. Five hours after the symptoms had somewhat abated, and next day the cow had recovered. In one instance both cow and calf were affected. The cow suffered as in the other cases, and the calf was similarly affected next day. Both recovered.

It will be seen from what has been said that blain, like other forms of urticaria, makes its appearance suddenly, and usually disappears in the course of twenty-four or forty-eight hours. The animal is first noticed to be trembling, and then the other symptoms (œdema of the eyelids, skin of the neck, perineal region, and in the female œdema of the cutaneous covering of the udder soon become apparent. Tympany and noisy breathing are present in some cases.

Treatment.—The majority of cases would probably recover if left untreated, but it is well to give a dose of magnesium sulphate and follow it up with a few doses of turpentine. Tracheotomy would be indicated where asphyxia threatened, owing to œdema of the larynx, and of course excessive tympany would necessitate the use of a trochar and cannula, but I have not met with a case in which surgical treatment was called for.

THE IMMUNITY OF MULES AGAINST HORSE-SICKNESS.

BY DR. ARNOLD THEILER, C.M.G., GOVERNMENT VETERINARY BACTERIOLOGIST.

THE inoculation of mules against horse-sickness was introduced into practice in November, 1905, in the various districts of the Transvaal, as well as in Swaziland and Rhodesia. A year later it was also adopted in the Orange River Colony, Natal, and Bechuanaland Protectorate; and from November, 1905, to June, 1908, some 12,000 mules have been treated in South Africa.

Within the last three seasons horse-sickness has been present in varying degrees of severity. It was fairly severe in 1905-06; the following season was an extremely bad one, but it was only mild in 1907-08. Naturally, the greatest number of immunized mules were exposed last year, but the season being mild, we are not entitled to attach any great importance to the results, although the experience gained proved very interesting. The two years, 1905-07, during which

time 8,325 immunized mules were exposed, offered a very severe test to the inoculation, and it is during these two years especially that we have been able to increase our knowledge concerning the immunity against horse-sickness in general, and of mules in particular.

The farmer considers an animal immune or "salted" against horse-sickness when that animal has had an attack of the disease, either the dik-kop or the dun-kop form.[1] He is inclined to believe that an animal which has recovered from an attack of dun-kop is not so well salted as the animal that recovered from dik-kop, and, generally speaking, thinks that an animal which has recovered from dik-kop is completely salted. If he was given the opportunity his choice would undoubtedly be for the animal that had recovered from dik-kop. The term "salted" is not only applied to animals that have recovered from horse-sickness, but also to those which, for some years, have been living in a notoriously bad district, and, although they were probably not noticed to contract the disease, the mere fact that the companions of such animals succumbed is considered to be sufficient proof that the surviving animals are salted. In this paper we shall apply the term "salted" to animals that have either actually recovered from an attack of the disease or else have resisted an otherwise fatal dose of horse-sickness virus.

Horse-sickness can be produced by the inoculation of blood taken from an animal suffering from either the dun-kop or the dik-kop form. At the time of inoculation it is impossible to say which form of the disease an animal will contract, but the fact is noteworthy that amongst animals inoculated with serum and virus, there is a greater percentage of animals showing the symptoms of dun-kop than of those showing the dik-kop form. Our experimental statistics show that for the years 1904-08, of 635 animals inoculated on the station, 103, or 16 per cent., showed the symptoms of dik-kop; the other 532, or 84 per cent., developed dun-kop, that is to say a fever reaction showing no visible symptoms, except in rare cases when an accelerated respiration is present.

Generally speaking, from our point of view the appearance of dik-kop is not a desirable occurrence. Experience has shown that the majority of animals contracting dik-kop before the thirteenth day do not survive, but they usually recover if they show signs of dik-kop after that period. The *post-mortem* examination of animals that die from dik-kop on this date or later, and particularly those that had symptoms of dik-kop and died after the thirteenth day, show extensive heart-lesions. It stands to reason, therefore, that in animals showing dik-kop after this date and recovering, these lesions must cause a defective heart to some extent, and such animals may reasonably be expected to no longer be the same spirited and fast animals as they were before the inoculation. There is, however, not any, or but little change in the pulmonary (dun-kop) form of horse-sickness, and a complete recovery is possible. This is apparent by the fact that after mules have recovered from mere fever reactions it is only in exceptional cases that any of them show a change in temperament or lose their swiftness.

[1] The "Dik-kop" form is the "swollen head" form, and "dun-kop" the "pulmonary" form of horse-sickness.—Ed., *V.J.*

It appears to us that since exactly the same virus and serum is used on a particular batch of animals, the appearance of dik-kop in only a certain percentage must be connected with the individuality of these animals. The same argument holds good with the 3 per cent. or 4 per cent. of animals which die during immunization. Undoubtedly some factor enters into consideration which we do not seem to understand, and, therefore, are unable to control.

When the inoculation was introduced into practice, all enquirers were informed that we considered the immunity given by the inoculation to be equal to and as good as that obtained from a natural attack of horse-sickness. We based this opinion on the fact that no difference was observed in the pathological lesions of mules contracting horse-sickness in the natural way, and by inoculation of virus. Naturally, under the influence of the serum the symptoms of the disease were of a milder character than those of animals contracting the disease spontaneously and recovering.

A further proof for our assertion was the fact that we were unable to break the immunity of any of our animals notwithstanding the injections of virus under the skin or into the jugular vein, and we only need refer to our method of preparing serum to show what enormous quantities of virus an immune animal can resist without the least breakdown in immunity. Our serum is obtained by hyperimmunizing the animals, that is to say by transfusing about 1½ gallons of virulent blood from a sick to a salted animal. One drop of horse-sickness blood is capable of producing the disease in the majority of susceptible animals, and we have rarely met an animal capable of resisting twenty drops of the virus which we use in practice. In other words, an immune mule resists between 9,000 and 180,000 times the quantity necessary to produce the disease in a susceptible animal. Our statistics on this point show that up to January, 1907, altogether 295 mules were experimentally tested in this way. Amongst these were forty-one mules which received 3 gallons, thirteen mules received 4½ gallons, one was infused with 6 gallons, and two with 7½ gallons, and, in no instance, was any breakdown of immunity observed. We, therefore, had reason to believe that once an animal was immunized it would resist enormous quantities of virus, and naturally considered that the same principle would hold in practice.

It must be stated here that these tests were always made with the same virus, that is, the virus with which the mules were inoculated; it was obtained from a horse suffering from horse-sickness contracted naturally in Pretoria, and, in distinction to any other virus, is called "ordinary."

Season 1905-06.

As already stated, the inoculation was introduced into the Transvaal and Rhodesia in 1905, and, by June, 1906, 3,235 mules had been treated. Of this number, twenty-one were reported to have died of horse-sickness after discharge, and forty-five as having shown symptoms of horse-sickness, described as relapses or "aanmaanings." Under these reports of relapses or aanmaanings we do not include animals which died between the 21st and 28th days after inoculation, but only those dying subsequently to the 28th day. Generally speaking, twenty-one days from the date of the inoculation is sufficient for an animal to

recover from horse-sickness, but, in quite exceptional cases, latent infections have been noted where the incubation time is longer than twenty days, so that the animal dies of horse-sickness within four weeks. It is practically impossible to state whether an animal which dies from four to five weeks after inoculation is suffering from a relapse or a prolonged incubation due to the inoculation of the virus.

Whether all the twenty-one animals mentioned died from horse-sickness we are not in the position to say, but we can confidently state that not more than twenty-one animals died after discharge from horse-sickness out of the 3,119 exposed. Thus, for the season 1905-06 the percentage of relapses was 1·4 per cent., and the mortality was only 0·6 per cent.

Hitherto I have not mentioned the experience of the farmers in regard to breakdowns in immunity. They refer to them as relapses or aanmaanings, and their opinions on this point differ somewhat. Many affirm that an animal immune to either form of horse-sickness is salted for its life-time; others believe that animals immune against horse-sickness will show a relapse every year, or, anyway, from time to time; whilst others again consider as salted animals only those that have recovered from the dik-kop form. The general opinion is that an animal suffering from aanmaaning will not die, provided it is not worked during that time and is well cared for.

The breakdowns which occurred in practice during the season under review, and which were entirely unexpected, rendered it necessary for us to investigate the matter and endeavour to elucidate the cause. I have mentioned that at the Laboratory we were unable to break the immunity of inoculated animals, notwithstanding the injection of large quantities of the same virus and the repetition of these injections at intervals. At first sight we were under the impression that one or the other animals immunized in practice might not have received the virus, but this opinion was untenable. It was then thought that under the influence of the serum some animals might not react at all; but in view of our experience at the Laboratory where, up to date, over 1,000 mules have been tested, this opinion had also to be abandoned, and nothing remained but to accept the fact that although our animals were immune against horse-sickness, yet, in practice, one or the other will show relapses.

By June, 1906, relapses were reported from Barberton, Lydenburg, Piet Retief, Rustenburg, Zoutpansberg, Waterberg, and Rhodesia. Two particular cases were investigated, one which occurred in Tzaneen, and another in Bulawayo. The former was a horse that had been immunized and tested against horse-sickness, and subsequently was exposed in that locality; it contracted horse-sickness, and died on April 7, 1906, and the virus (referred to as "Tzaneen") was forwarded to the Laboratory. The other was a mule in Bulawayo that had been immunized in the ordinary way, but showed a relapse to horse-sickness after discharge on April 9, 1906, during which time it was tapped, and the virus (called "Bulawayo") was sent to Pretoria.

In order to settle the point whether an animal that had been immunized on this station would contract horse-sickness when subjected to either of the two viruses, the following experiments were made:—

(1) One hundred and thirty-nine mules immune against ordinary virus

were subsequently tested with Tzaneen virus; the result being that twelve showed reactions; four reactions with lesions of dik-kop; and one gave a reaction and died.

(2) Thirty-six mules immune against the ordinary virus were subsequently tested with Bulawayo virus, the result being that eight showed reactions; six reactions with dik-kop; and six gave reactions and died.

Thus it was established in an unmistakable way that we were able to produce horse-sickness in animals which undoubtedly were immune, by the injection of virus of a different nature to that with which they were previously immunized.

Among these tests which were carried out were mules which, previously to the injection of Tzaneen or Bulawayo virus, had been hyperimmunized three and four times with ordinary virus.

The cases of the following mules afford interesting examples of this phenomena:—

(*a*) One mule, No. 1,044, immune against ordinary virus, was hyperimmunized with 6 gallons of ordinary virus; tested later by the injection of 10 cc. (200 drops) of Tzaneen virus and showed a reaction.

(*b*) One mule, No. 1,043, immune against ordinary virus, was hyperimmunized with 1½ gallons of ordinary virus; tested later with 5 cc. Tzaneen virus and showed a reaction; re-tested with 5 cc. Bulawayo virus and showed a reaction.

(*c*) Four mules, Nos. 849, 889, 1,018, and 1,040, immune against ordinary virus, were hyperimmunized with 3 gallons each of the same virus; tested later by the injection of 5 cc. Tzaneen virus, and one showed a reaction; re-tested with 5 cc. Bulawayo virus, and 3 showed reactions accompanied with dik-kop, and one gave a reaction and died of horse-sickness.

SEASON 1906-07.

From these experiments, in the first instance, we concluded that virus Tzaneen and Bulawayo were stronger than the virus ordinary with which the mules had been immunized, and we naturally considered that, for practical purposes, it would be more advisable to immunize in future with a virus which breaks the immunity obtained from the ordinary virus. Accordingly, at the commencement of the season 1906-07, we introduced the Tzaneen virus into practice, concluding that, as it was a low-veld virus, it would be eminently suitable for the conditions of the Transvaal.

Subsequent to the introduction of the Tzaneen virus into practice in September, 1906, experiments were conducted on the station for the purpose of testing the immunity in the reverse order, and to see whether animals immune against Tzaneen virus would be immune when tested with ordinary and Bulawayo virus, and also if animals immune against Bulawayo virus would be protected against ordinary and Tzaneen virus.

The following statistics compiled from the complete experiments give the necessary information on these points:—

(*a*) Fifty-nine mules, immune against Tzaneen virus, were tested later with ordinary virus; the result was that forty-seven showed reactions; two reactions, accompanied with the symptoms of dik-kop; and five gave reactions and died of horse-sickness.

(*b*) Thirteen mules, immune against Tzaneen virus, were tested later with Bulawayo virus, the result being that eight showed reactions, and one gave a reaction and died of horse-sickness.

(*c*) Three mules, immune against Bulawayo virus, were tested later with ordinary virus, and all showed reactions.

(*d*) Five mules, immune against Bulawayo virus, were tested later with Tzaneen virus, and three gave reactions.

Our experiments not only demonstrate the fact that the immunity obtained from one virus does not completely protect against either of the other two, but that animals immune against two of the three vira may break down when subjected to the third virus. The following serves as an example: two mules immune against a mixture of Tzaneen and Bulawayo virus were tested at a later date with ordinary virus, and both showed reactions.

From this it is evident that we cannot exactly speak of a virus being stronger than another one, but that each virus produces a different immunity.

The particulars of breakdowns given previously enable us to arrange the virus in the following order:—

	Reactions Per cent.	Reactions and Dik-kop. Per cent.	Reactions and Death. Per cent.
Immunity against ordinary virus is broken by Tzaneen virus to the extent of	9	3	0·7
Immunity against Tzaneen virus is broken by Bulawayo virus to the extent of	61	*Nil*	8
Immunity against Tzaneen virus is broken by ordinary virus to the extent of	80	2	8
Immunity against ordinary virus is broken by Bulawayo virus to the extent of	22	17	17
Immunity against Bulawayo virus is broken by Txaneen virus to the extent of	60	—	—
Immunity against Bulawayo virus is broken by ordinary virus to the extent of	100	—	—
Immunity against Tzaneen and Bulawayo virus is broken by ordinary virus to the extent of ...	100	—	—

The above statistics are compiled from the relapses amongst mules tested at the Laboratory, and these tests were undoubtedly severe. They prove that immunity in a mule from either virus can be broken down, but they do not give an accurate picture of what really happens in practice.

As already stated we were under the impression that the Tzaneen virus would be stronger than the ordinary virus, and, therefore, the immunity would be better, and, by the beginning of 1907, over 1,200 mules were inoculated with that particular virus. The breakdowns of mules were reported as under:—

	Per cent.
Pietersburg-inoculated 193 mules, and 7 were reported to have died, after discharge, from horse-sickness	1
Waterberg-inoculated 162 mules, and 1 was reported to have died, after discharge, from horse-sickness	0·6
Middelburg-inoculated 78 mules, and 3 were reported to have died, after discharge, from horse-sickness	1
Barberton-inoculated 31 mules, and 1 was reported to have died, after discharge, from horse-sickness	3
Pretoria-inoculated 375 mules, and 1 was reported to have died, after discharge, from horse-sickness	0·3

In other words, immunity against Tzaneen virus protects against natural infection in practice to the extent of about 98·5 per cent.

Comparing these results with the experimental tests, we notice the enormous difference between a practical and an experimental test; the difference in immunity between ordinary virus as experienced in 1905-06 and that of 1906-07 is but very slight, so that, for all practical purposes, the immunity obtained from the Tzaneen virus (98·5 per cent.) is only slightly less than that given by the ordinary virus (99·4 per cent).

SEASON 1907-08.

As far as it was possible, blood of breakdowns occurring in 1905-07 was collected by the District Veterinary Surgeons and forwarded to the Laboratory for the purpose of further investigations.

Seeing that one particular kind of virus alone was not able to completely protect against subsequent inoculations of a second or third virus, we proceeded to make what is called a "polyvalent virus," namely, a virus composed of blood collected from mules showing relapses in practice, together with the ordinary virus already used in practice, the virus Tzaneen introduced in September, 1906, and the virus Bulawayo, which has not yet been used for practical purposes, and, in addition, all the blood collected from spontaneous cases of horse-sickness, chiefly in the Zoutpansberg district. These were all mixed together, and a horse was injected, which developed horse-sickness; it was tapped during the reaction, and this virus was called polyvalent. A number of experiments were now made to test the value of the immunity of an animal inoculated with the polyvalent virus.

Altogether 100 mules were immunized against this polyvalent virus, and were subsequently tested. The following statistics show the results of the tests:—

	Reactions Per cent.	Reactions with Dik-kop. Per cent.	Reactions and Death. Per cent.
Immunity against polyvalent virus is broken by ordinary virus to the extent of	*Nil*	*Nil*	*Nil*
Immunity against polyvalent virus is broken by polyvalent virus	15	—	—
Immunity against polyvalent virus is broken by Tzaneen virus to the extent of	50	12	—
Immunity against polyvalent virus is broken by virus collected from relapse cases in the Transvaal ...	59	14	—
Immunity against polyvalent virus is broken by virus collected from spontaneous cases in the Transvaal	70	—	—
Immunity against polyvalent virus is broken by Bulawayo virus to the extent of	100	—	—

This shows that polyvalent virus, although it did not completely prohibit a reaction from its constituents, prevented mortality. It further shows that it was equally as good as the ordinary virus, since it completely protected against that one.

The fact that polyvalent virus did not protect against all of the constituents as it should have done, shows that in passing the polyvalent virus through a horse one or more of the viruses must have been excluded from the mixture with which the horse was injected.

For the year 1907-08 the polyvalent virus was introduced into practice, and 2,419 mules were inoculated. The season was not a

severe one, but, notwithstanding this, eighteen deaths occurred after discharge = 0·7 per cent.

One particular instance proved to be of an extraordinary interest. In Potgietersrust, out of a number of animals which were immunized in this particular way, eleven died after discharge. With our experimental experience at our disposal, we were not able to explain this mortality, thinking at the time that not all the mules had become immunized. Accordingly, we sent twenty of our own mules to that particular locality, which had previously been immunized by us with the same virus, and the result was that one animal contracted horse-sickness and died. On the other hand, we took a number of animals that had been running in Potgietersrust down to Pretoria, and tested them with the same virus, with the result that they resisted the inoculation, showing that they were really immune against horse-sickness, and that the breakdowns in immunity were due to a new attack of horse-sickness. In other words, in a certain locality where the immunized mules were exposed, one particular strain of virus may have been existing against which our immunity did not hold good.

Thus our experience proves that the polyvalency of the virus does not give complete immunity, and is not yet sufficient for practical purposes. Accordingly, we again decided to increase the polyvalency of the virus by introducing into it, in addition to the strains with which we have inoculated hitherto, such other strains as have broken the immunity, and, in adding to the strain of polyvalent virus the new viruses of relapses, we hope to finally arrive at a virus which will give immunity against any strain of the country. Experience, however, will have to show whether a complete immunity is possible or not.

Since the introduction of the polyvalent virus was followed by a slight increase of mortality from the inoculation, it can reasonably be expected that, with the increase of the polyvalent virus, the mortality from the inoculation may also increase, and it remains to be seen whether the improvement in immunity can be given without incurring too much risk of mortality at the time of inoculation.

* * * *

The question may, perhaps, suggest itself whether an immunity of an animal can be increased by the repeated injection of different strains of viruses at intervals, and the following table may prove interesting :—

PERCENTAGE OF REACTIONS AND DEATHS AMONGST IMMUNIZED MULES WHEN SUBSEQUENTLY TESTED.

Number of Test.	Reactions. Per cent.	Deaths. Per cent.
1st	2·4	1·8
2nd	2·8	*Nil*
3rd	1·9	0·7
4th	2·5	0·3
5th	1·2	0·3
6th, 7th, and 8th	*Nil*	*Nil*

From the above it is evident that reactions and deaths only cease after the fifth test.

* * * *

At the commencement of this article I alluded to the opinions of the farmers, that animals which recovered from dik-kop are better

salted than those which have recovered from dun-kop. Naturally, statistics will decide this question, and from our experimental animals we are able to compile the following:—

(*a*) 16 per cent. of inoculated mules show dik-kop during treatment; 84 per cent. of inoculated mules show dun-kop during treatment.

(*b*) When mules that have salted from the "dik-kop" form are tested at a later date, 8 per cent. show dik-kop again, and 21 per cent. show dun-kop.

(*c*) When mules that have salted from the dun-kop form are tested at a later date, 4 per cent. show dik-kop, and 28 per cent. show dun-kop.

Thus it will be seen that animals that have recovered from the dik-kop form may still contract dik-kop later, and that the percentage of relapses in "dik-kop immune mules" is only slightly less than in "dun-kop immune mules." But the number of "dik-kop immune mules" showing subsequent relapses with dik-kop is fifty per cent. greater than the number of "dun-kop immune mules" showing subsequent relapses of dik-kop.

The case of Mule No. 2214 is particularly interesting; this animal was inoculated with Tzaneen virus and gave a reaction accompanied with the symptoms of dik-kop; subsequently it was tested with ordinary virus and again gave a reaction accompanied with dik-kop. It was then exposed to natural infection near Pretoria, and showed another relapse with dik-kop present for the third time.

The following table may, perhaps, prove interesting as demonstrating the variation in relapses amongst inoculated mules in the several districts of the Transvaal:—

PERCENTAGE OF MORTALITY OCCURRING AFTER DISCHARGE IN THE VARIOUS DISTRICTS AMONGST SOME 9,000 IMMUNIZED MULES EXPOSED TO NATURAL INFECTION FROM SEPTEMBER, 1906

	Per cent.
Barberton	3
Waterberg	3
Lydenburg	2
Rustenburg	2
Piet Retief	2
Middelburg	1
Potchefstroom	1
Pretoria...	1
Zoutpansberg	1
Ermelo...	*Nil*
Heidelberg	*Nil*
Marico and Lichtenburg	*Nil*
Standerton	*Nil*
Witwatersrand	*Nil*

* * * * *

CONCLUSIONS.

(1) The experience in practice has shown that an inoculation of mules with any of the virus used, protected against death to the extent of 1·3 per cent.

(2) The immunity is by no means absolute.

(3) Breakdowns vary in the different districts, and even in the same locality.

(4) In the Laboratory we were able to break the immunity given by almost any virus, with blood obtained from immunized animals that died from horse-sickness after exposure.

* * * *

All these facts prove the truth of the observation made by the South African farmer many years ago, and which he sums up in his remark that "a horse may be salted for one district or for one locality, and is not salted for another."

(*Transvaal Agricultural Journal.*)

ENSILAGE.

Sour Silage.—Sour silage has a pale green colour, and should have a pleasant vinous aroma, with a slightly acid flavour. Dairymen favour this sort for milk production. (1) The crop requires to be cut when full of succulence, often when just a little immature. (2) It must be carted and siloed directly after cutting. (3) Silo must be filled rapidly and thoroughly tramped all over. (4) The temperature should be kept at from 90° F. to 120° F.; but the lower temperature is most in favour. To keep in the region of the nineties, quick filling and trampling must be resorted to, whilst above, from 100° F. to 120° F., the filling may proceed each day. To lower the temperature when filling, the mass must be consolidated by trampling, and then add more silage. If full, and the temperature is rising, lay down some bagging, and put on a layer of earth or handy weighing material, allowing it to remain.

Sweet Silage.—In appearance, sweet silage should be of a nut to dark brown colour, and have a rich fruity, somewhat alcoholic aroma. (1) The crop must be cut when succulent; (2) the process of filling must go on gradually, so as to allow the temperature to rise; (3) the temperature may rise from 120° F. to 150° F.; (4) best results are obtained at temperatures ranging from 130° F. to 140° F. It is often necessary to fill on alternate days, or else to arrange for the crop to lie for a few hours, or overnight in the field, before carting it in. Sweet silage may be made from wilted maize or sorghums which have gone beyond the usual succulent period, but as the temperatures usually run high it is necessary to apply pressure. In a sectional view of a stack the lower layers are of a pale-green colour, and may be classed as "sour." This is accounted for by the exclusion of the air, due to the weight of stuff above. The silage gets darker in colour as the temperature rises in the higher layers. At 160° F. it becomes almost black or "mow" burnt, and then deteriorates in quality.—"The Dairying Industry"—G. S. Thomson.

Amount of Silage per Day.—A cubic foot of silage properly compressed runs from 35 lb. to 40 lb. in weight, and sometimes over; thus a ton will occupy some 50 cubic ft. If a cow has access to other feed, a cubic foot per day will suffice; but when silage only is reckoned upon to supply the bulk so necessary for ruminant animals, 50 lb. are required.

Clinical Articles.

EVENTRATION OF THE SMALL INTESTINE OF A MARE, RESULTING FROM AN INJURY IN THE HUNTING FIELD.

BY THOMAS WILSON, M.R.C.V.S., NANTWICH, CHESHIRE.

Subject.—A well-bred bay huntress, rising 6 years old, the property of a local horse-dealer.

History.—On November 22, 1908, the mare was being ridden with the Cheshire Hounds, and during the later part of the afternoon, whilst jumping one of the fences, it appears that she dropped on some sharp stake, which penetrated the abdominal wall close to the left external abdominal ring.

The gentleman who was riding the mare did not know at what time the injury was inflicted, and his attention was first drawn to it by another person riding alongside of him, who noticed that the mare's bowel was protruding through a wound in the abdominal wall. How far the mare had galloped before the bowel was noticed I cannot say, but the rider said she must have come through several fields after the accident happened, and no doubt the bowel did not come out immediately after the accident, but when the mare was galloping along. After the wound was noticed the mare was led for about a quarter of a mile to the nearest farm, and I was then telegraphed for. On arriving at the place, which was about 4 miles distance, I found the mare standing in a loose-box with an attendant holding her head and preventing her from lying down, whilst another man was fomenting the protruding bowel with warm water, to which he had added a little carbolic acid. The mare was in great pain and sweating profusely, and the attendants had much difficulty in keeping her on her feet.

Diagnosis.—After disinfecting my hands and arms, I found on examination that the eventrated portion of bowel consisted of between 2 and 3 ft. of small intestine, which was protruding through a small wound, about 2 in. in diameter, in the abdominal wall and close to the left external abdominal ring. The eventrated portion of small intestine and the mesenteric blood-vessels running to it were much congested, and showing the first stage of strangulation.

Prognosis.—I told the owner that I dld not think there was any chance of the mare recovering, but, seeing that she was such a valuable huntress, I would be pleased to operate on her, so he was quite willing that I should do so.

Treatment.—A clean piece of linen saturated in a ½ per cent. solution of carbolic acid was applied over the protruding bowel, and a broad bandage was then put round the abdomen to act as a further protection and support to the intestine. The mare was then led into a field close to and cast, on sloping ground, with the head uphill, and secured with side-lines in the same manner that the stallion is cast for castration.

I next thoroughly washed and disinfected my hands and arms, and then removed the cloths from over the bowel. The latter, together with the surrounding parts, were then well cleansed with a 1 per cent. solution of carbolic acid, and another examination of the wound was

made. This was found to be a deep, punctured, lacerated wound, communicating with the inguinal canal and internal abdominal ring.

The wound and protruding bowel were next well cleansed with a solution of chinosol 1 in 500, and an attempt was then made to return the eventrated organ, but this was impossible, as by this time—being over two hours since it was first eventrated—it had become very enlarged and congested. The wound was therefore enlarged about an inch anteriorly, and about the same distance posteriorly, and another attempt made to reduce the bowel; this was accomplished after a little careful manipulation.

The wound was then swabbed with cotton-wool, which had been soaking in a solution of chinosol 1 in 500 for about twenty minutes; the muscular coat of the abdominal wall was then sutured with silk (which had been rendered aseptic by prolonged soaking in chinosol solution), another row of sutures was put through the skin, and the mare then allowed to rise.

After the mare had risen she was well rugged up, then walked forward for a few yards and made to stand for about twenty minutes with her fore feet in a dry ditch, thus elevating the hind quarters and throwing the weight of the bowels forwards from the wound.

She was then taken into a loose-box and made to stand with her hind feet on a platform composed of railway sleepers, and so raising her hind quarters about 6 in. above the fore ones. The mare looked bright and well, considering what she had gone through, and had shown no pain from the moment the bowel was returned into the abdominal cavity. She was then given a draught composed of chlorodyne ʒss., eth. meth. ʒi., aqua ad Oi., and this was repeated about six hours later. A few hours after the operation the mare drank about 2 quarts of oatmeal gruel which was offered her, and she also passed fæces normally.

During the next three days inflammatory effusion appeared along the under surface of the abdomen, commencing in the region of the wound and spreading forwards towards the front legs. The mare's temperature in the meantime did not rise to above 101·5° F.; her pulse was strong and appetite good. Up to and including the third day hot cloths were kept continually applied to the abdomen, and after this their use was discontinued. She was fed on laxative diet, and food was given in small quantities at a time; she was also given twice daily for the first six days quinine sulph. ʒi., combined with a stimulant, generally ammon. carb. ʒii.

On the third day the sleepers were removed, and she was allowed to walk about the box, but was not allowed to lie down until after the sixth day. Some of the stitches were removed on the third day, and the wound was afterwards syringed out twice daily with a 2 per cent. solution of creolin and then packed with iodoform gauze.

On the sixth day the internal administration of quinine was discontinued, the swelling along the abdomen was rapidly disappearing, and the risk of peritonitis considered to be fairly well past, to act as a preventive to which quinine had been given.

After the ninth day the wound was only dressed once daily, as all swelling from the abdomen had disappeared, and the mare was feeding well and moving about freely.

On the fourteenth day she was walked home, and from now

onwards the treatment was that of an ordinary wound. The wound healed very quickly, as suppuration was very slight considering the amount of laceration to the tissues. In seven weeks from the date of the accident the mare was put to regular walking exercise each day; at the end of the eighth week she did half a day's hunting, and from that time onwards has hunted regularly with the Cheshire Hounds, and none the worse for her accident.

SOME CASES OF AZOTURIA.[1]

BY DR. F. J. BRAUND, BOISSEVAIN, MANITOBA.

In reporting the following cases of azoturia, black disury, lumbago, hæmoglobinuria, or imperfect hepatic function, I am not attempting to enter into the definition, nature, cause, &c., or even offering any theory to the confusion already existing in dealing with this, one of the oldest of all known equine diseases. I believe that a great many cases reported to us from time to time as "dropped dead from heart trouble" are nothing more or less than marked cases of azoturia. My object is to promote discussion, and thereby produce interchange of opinions, which may tend to explain the etiology and therapeutics of this often fatal disease. Friedberger and Fröhmer say that the epithet "Rheumatismal" may be correctly applied to almost all cases we meet in practice. According to Goring, the complaint may be experimentally produced by chill. I cannot agree with this, as I have met with cases at all seasons of the year, but think that it is rather more prevalent during the winter months. I have also noticed that mares seem more susceptible than stallions or geldings. Law gives the mortality at 20 per cent., Friedberger and Fröhmer at from 20 per cent. to 40 per cent., but in case of pronounced paralysis is from 50 to 70 per cent.

From the careful study of a large number of cases treated during the last two years with potassium iodide, I think the mortality can be brought considerably below these figures. In all the cases treated, I have abandoned the use of slings. I do not believe in bleeding. I have tried veterinary albumone put up by the Iris Chemical Company, but cannot say anything in its favour. I notice that Parke, Davis and Co. strongly recommend adrenalin in the treatment of azoturia, and I intend giving it a fair trial. I am only mentioning some of the cases which have made a good and complete recovery. Of course there are others that fail to respond to even the iodide treatment, but I can safely say that since following that line of treatment I do not dread the disease as formerly, and the mortality has not been more than 5 per cent. in some fifty cases. I might state that I have one case that has had three attacks within a year, and is still alive.

Case 1.—November 13, 1908. The subject was a grey mare, in plethoric condition, aged 5.

History.—The mare had been working continuously, but owing to the weather she had been standing idle for two or three days with no alteration in her feed. She was then harnessed and driven to town

[1] Read before the Veterinary Association of Manitoba.

(some 12 miles). About half-way she showed well-marked symptoms of lameness in the near hind leg. The owner called at the first farm and sent for me.

Symptoms.—I found the mare down, perspiring freely. She appeared to be in great pain, with pulse quickened, and temperature 102° F.

Diagnosis.—Azoturia.

Treatment.—Used catheter. Gave hypodermically physostigmine salicyl. gr. ii., and as a drench, potassii iod. ʒiv., aquæ ℥iv. I left the following medicine: potassii iod. ʒiss., aquæ ℥viii. Fiat. mist. Sig. ℥ii. o. h. c̄ aquæ.

I used mustard freely over muscles, and afterwards blistered thoroughly. The mare was on her feet on the fourth day, but very lame and stiff. I saw this mare on the 14th, 15th, 16th, and 17th. I then considered her fit to be removed to the owner's farm, which was accordingly done on the 20th inst., and although lame for several weeks, made a complete recovery.

Case 2.—Subject, bay mare, aged 7.

History.—Similar to the above, but in this case the horse reached my barn, a distance of 10 miles. The owner told me he thought the mare had sprained her leg.

Symptoms.—Very stiff on the near hind leg, temperature 101·2° F., muscles hard.

Diagnosis.—Azoturia.

Treatment.—Urine removed by catheter, which confirmed my diagnosis. Gave potassii iod. ʒiss., aquæ ℥viii. Fiat. mist. Sig. ℥ii. o. h. c̄ aquæ.

I also applied smart blister to muscles. I kept this mare in barn for four days. Complete recovery.

Case 3.—This subject was a grey mare, in plethoric condition, aged 6.

History.—This was a very bad case. The mare got down in a snowdrift about 2 miles from town, and had to be drawn in on a stone boat. Weather was very cold.

Symptoms.—Complete paralysis of hind quarters, perspiring freely, great pain, pulse quickened; temperature 104° F.

Diagnosis.—Azoturia.

Prognosis.—Unfavourable.

Treatment.—Emptied bladder with catheter. Gave hypodermically physostigmine salicyl. gr. ii, followed by potassii iod. ʒvi., aquæ Oss., as a drench. Left potassii iod. ʒii., aquæ ℥viii. Sig. ℥ii. o. h. c̄ aquæ.

I also gave strychnine hypodermically, and blistered the loins thoroughly; drew off urine three times daily, and gave stimulants freely. On the third day the animal was on her feet, and made a good recovery in about ten days.

Case 4.—This was the only case I have met with of azoturia affecting the muscles of the fore extremity.

History.—Grey horse, aged 7, in good condition; went suddenly lame on the near fore leg, and the owner could not account for it.

Symptoms.—Near fore leg very stiff, and muscles hard; pulse quickened; temperature 102·2° F., perspiring and showing considerable pain.

Diagnosis.—Azoturia.

Treatment.—Emptied bladder with catheter, which confirmed my diagnosis. Gave aloes barb. ʒi., sodii bicarb. ʒiii., zingiber, nux. vom. ʒi. aquæ Oss. Fiat. haustus. I also left potassii iod. ʒiss., aquæ ʒvi. Sig. ʒiss. o. h. c̄ aquæ.

I applied a good stimulating liniment on leg, &c. The horse made a complete recovery in about a week, but finally had a second attack about six months later, and died before I could get out to him.

POISONING BY CREOSOTE.

BY G. D. LANDER, D.SC., PROFESSOR IN THE ROYAL VETERINARY COLLEGE, LONDON.

SINCE cases of poisoning of cattle by carbolic acid or the closely allied creosote (tar acids) are rare, some interest attaches to one brought under my notice in February of this year by Mr. W. P. Loft, M.R.C.V.S., of Grantham.

Poisoning had extended over a period of some years, and over £700 worth of stock had succumbed. With regard to the more recent cases, Mr. Loft writes: "The symptoms of the latest are blindness, unthriftiness, coats staring, diarrhœa of a blackish colour," &c.

Post-mortem examination revealed a very peculiar smell, but not creosote or carbolic acid; in the stomach there was a large patch of inflammation of port-wine colour; the large colon *only* was very much thickened in its coat, and the mucous membrane dark—nearly black.

Referring to the *post mortem* of a cob found dead at the same farm, he says: "I discovered very extensive inflammation of the stomach —port-wine colour. On the lining of the large colon throughout was a thick, dark, gelatinous exudate. In the small intestines the fæces were liquid and nearly black."

The water in a pool to which the animals had access was examined n my laboratory, the sample being taken on the same day as the cob was found dead. It was very turbid, containing considerable suspended matter. There was present 14·5 parts of chlorine per 100,000, showing that it was contaminated by sewage. It was found to contain free creosote oil, which was present in such quantity that part remained undissolved in the water, which when distilled gave an abundance of creosote in the distillate. The quantity actually separated by distillation was at least ·27 per cent., or 18·9 grains of creosote per pound.

Although creosote is considerably less poisonous than carbolic acid, the quantities represented by the above proportion would undoubtedly be sufficient to cause death.

ACUTE INFLAMMATION OF THE KIDNEY.

BY G. MAYALL, M.R.C.V.S., NORWICH.

I WAS called to see a bay cart gelding, aged 9, belonging to a corporation. He was off his feed, and had an anxious facial expression. He looked round occasionally to his loins. His temperature was 103° F., pulse weak and oppressed. I was informed that he seemed to have difficulty in urinating. He had not been off work. He was given an anodyne drink, which seemed to relieve the pain. In

the morning his appetite was still bad, and my attention was called to his urine, the horse-keeper saying he thought he was passing blood in it. The urine on the floor of the stall looked somewhat suspicious, so I told him to keep me some from the horse. In the meantime I prescribed a draught of ext. hyoscyami ʒi., æther nit. ʒ ss., aquæ Oss., three times daily.

The following day I had an opportunity of examining about 3 pints of what the gelding had passed by the urethra. I found it to consist of dark reddish brown urine, and about a pint of stuff in strings which I found was clotted blood in the form of cylinders; some were long, lightish-coloured, and homogeneous, and others shorter. A diagnosis was given of inflammation of the kidneys, and the horse was put on to a draught three times daily of hazeline ʒi. and ext. hyoscyami ʒi., aquæ Oss. Linseed tea was given him to drink. He was under treatment for a fortnight, but did not improve, except a little in his feeding. He was sent away to the corporation farm, where he lingered for about a month, and then died. I had no opportunity of making a *post mortem*. I think it very unlikely that the horse had been drugged with any poison, *e.g.*, cantharides or phosphorus. He had had no influenza or blood disease since he had been bought.

The symptoms during life seemed to point exclusively to a kidney affection, and it is the only case of the kind I have seen in fourteen years practice.

Some of the cylinders were a few inches in length, and others half a foot and more long.

THE TREATMENT OF DISTEMPER.

BY JOHN A. RALEIGH, GOVERNMENT VETERINARY SURGEON, GEORGETOWN, DEMERARA, BRITISH GUIANA.

To those interested in dogs the subject of distemper causes considerable dissatisfaction, for, according to statistics, the death-rate in Europe averages about 66 per cent. I know of no disease which is accompanied by such a variety of complications. Cases have been brought to my infirmary where the animals have been suffering from cerebral symptoms, pneumonia, dysentery, vomiting, and a gangrenous tongue, all occurring as complications of distemper. To treat all these complications, and feed and nurse a dog in such a condition, would require the constant attention of a professional man, and even then the chance of recovering would be remote. I have never known a case of distemper in British Guiana without complications. Possibly this is due to the delay of owners out here in sending their animals for treatment; it is, nevertheless, a fact.

For years I have experimented with various drugs, those recommended in text-books and others; but it was not until acetozone was used that I became satisfied with the results. The use of calomel and sodium hyposulphite was partially successful, resulting in a cure of 60 per cent. of cases treated. My procedure in such cases was to administer on arrival 4 to 6 grains of calomel; 10 grains of hyposulphite of soda were then given four times a day until convalescence was well advanced. A course of tonics completed the return to the

patient's usual health. I would mention that the spots and sores about the body were bathed with an antiseptic lotion, and the eyes and nose kept free of secretions. As diet, milk and Brand's extract of beef were given; different kinds of alcohol were tried, *i.e.*, wines, whisky, and brandy, but the effects were unsatisfactory, as they seemed to irritate the local intestinal lesions.

For the treatment of distemper to be satisfactory I esteem it highly essential that the patient should be disturbed as little as possible, and it was this important fact that led me to obtain from acetozone considerably better results than hitherto, for it is easily and readily administered with the patient's nourishment. After a previous administration of 4 to 6 grains of calomel, acetozone (10 grains to a pint of water) is given mixed with condensed milk or sterilized cream, in which form dogs will usually lap it up. In the occasional cases of refusal I have found that a drench or two leads the patient to a ready acceptance of the mixture. For the average-sized pup 5 oz. repeated four times a day will be sufficient; in the case of smaller patients it may be necessary to reduce the dose. After one or two doses the patient seems to get relief, which I attribute to the powerful antiseptic, yet non-irritating, properties of this drug. On the second day the animal is usually so improved as to be trusted with scraped raw beef in small quantities, and a little bread and broth; after this the discretion of the veterinary surgeon will dictate a suitable diet. The acetozone treatment should be continued until convalescence is well established, when mineral tonics ought to be given.

The results of the use of acetozone in my hands have shown great improvement in my average of cures. Whereas formerly 40 per cent. of the cases were fatal, now the mortality has fallen as low as 10 per cent., which great improvement in my results I can only attribute to the adoption of this preparation as a remedy.

CRYPTORCHID WITH AN ENORMOUS TESTICLE FOUND ON *POST-MORTEM* EXAMINATION.

BY DR. BEECKER (COLOGNE.)

At the beginning of May I was asked to castrate a cryptorchid. On examination of the horse I found the right testicle present, whilst I came to the conclusion that the left one was in the abdomen, and that I had an abdominal cryptorchid to deal with. The operation was performed sixteen days later. As preparation, the colt, aged 2, of Rhenish breed, was fasted for a day and a half; half an hour before operating he had a subcutaneous injection of 0·5 grm. (7·5 grains) of morphine hydrochlor.

After careful disinfection of the field of operation and my hand and arm, the neighbourhood of the left inguinal canal was thoroughly explored in order to gain information about the internal abdominal ring. The latter was scarcely tangible, and I found no sign of a processus vaginalis or the occurrence of any part of a left testicle. Then I proceeded to operate. About the middle of the external left

abdominal ring I made an incision 10 to 12 cm. long (5 to 6 in.) through the skin, and separated the subcutaneous tissue and fascia. I pushed a rather thick vein on one side, and worked my way through to the internal abdominal ring, which I found abnormally narrow. In order to gain admittance to the abdomen I pierced through the internal oblique abdominal muscle and peritoneum, and went through into the cavity with my index and middle fingers. I felt about on all sides of the opening for a testicle or portion of cord. I next pushed my whole hand through, and sought again for a testicle. I could discover no trace of one; the situations of other reachable parts, such as the bladder, rectum, and cord of the right testicle, were clearly ascertainable. Half an hour's search giving no result, I desisted for a time. There was a fair amount of venous hæmorrhage on taking my hand out of the site of operation, but I compressed the vessel and rested a while. I then put my arm into the abdominal cavity up to the elbow-joint, but could find no testicle, so wishing to conclude my operation I asked an assistant veterinary surgeon to put his hand and arm into the abdominal cavity whilst I passed mine up the rectum, but we got no success.

The search for the testicle was abandoned, and the wound carefully sutured, and the horse brought into a stall, where he was ordered to be kept tied up short for eight days. I expected to hear of his death in two or three days, but a postcard came on the sixth day to say that the patient had had a sudden prolapse of the bowel in the evening, and had been slaughtered and on *post mortem* a surprising result was found in a testicle weighing 100 lb.

I went over at mid-day and saw the *post mortem* which had been conducted by Dr. Lothes. I found an enormous tumour, which on closer examination proved to be the deformed left testicle. The tumour was 79 cm. in length, 69 cm. in breadth, and 41 cm. in height, and weighed 72 kilogrammes. The spermatic cord was hardened and thickened. The situation of this enormous tumour was interesting. In consequence of its size and weight it had become pressed forward right up against the liver. Here it was fixed between the right kidney and the liver. It had grown to the latter organ, and had caused a hardening of that organ, and the right kidney was also affected and double the normal size. The right testicle was deformed and enlarged. The peritoneum only showed slight change, and in the neighbourhood of the perforation place there was slight discoloration and little flocculi. It was thus assumed that the horse would not have succumbed but for the prolapse and necessary slaughter. The *post mortem* also showed plainly why no trace of a left testicle could be found.

Walley in the *Journal of Comparative Pathology and Therapeutics*, vol. vii., describes a round-cell sarcoma of 25 kilogrammes in weight in the abdominal cavity of a monorchid horse. Schuemacher describes one of 145 kilogrammes. Kitt calls the tumour orchidoma or orchidoblastoma, since it is doubtful whether the cells arise in their embryonal form as epithelial or sarcoma cells.

Histological examination showed fatty tissue and round cells sparsely united with connective tissue. At the periphery there were plain remains of testicular tisssue. "Sarcoma globucellulare lipomatosum" would describe the tumour histologically.—G. M.

(*Ex Berliner Tierärtz. Woch.*)

A CASE OF APROSOPIA (HEAD WITHOUT A FACE) AND PEROMELIA (DEFECTIVE LIMBS) WITH INTERESTING ECTODERM CANAL IN A CALF.

BY PROFESSOR JOEST (DRESDEN).

THIS interesting calf's fœtus was sent to the Pathological Institute at Dresden by the director of an abattoir. The body of the calf possessed a length of 67 cm., a breadth in the neighbourhood of the shoulder of 36 cm., and in that of the pelvis 43 cm. As the figure shows, it appeared shortened and of plump compressed form. Anteriorly, the body ended in a rounded part, corresponding to the

A case of aprosopia and peromelia in the calf.

cranium. This part showed on both sides prominences from half a walnut to half a pigeon's egg in size, which originated from thin bone lamellæ. The ventral aspect showed two more structures about half the size of a hazel nut. These four forms are the rudiments of nasal conchas. Between the conchas in the median line is a double fold of mucous membrane, which dorsally changes into the outer skin. Ventrally from the nasal orifices and the mucous membrane folds is a transversely situated opening leading into a maxillary cavity, and bounded by the base of the tongue. The tongue, of normal size and consistence, hangs as an appendix from the anterior end of the body. The lower jaw is rudimentary, and takes the shape of a short round bow, not quite reaching across half the tongue. Incisors and molars

are present in the lower jaw, but very irregularly placed. Upper jaw absent. Ears and ear passages absent. The anterior end of the body possesses a quantity of smooth mucous membrane, generally terminating in outer skin.

In place of limbs the body possesses four short, plump, rounded stumps, covered over by skin, except in the case of the left hind one. No tail and no hoofs. The bowels and lungs are normal. The heart outside the thoracic cavity, and situated subcutaneously on the lower side of the neck. Brain and medulla oblongata without deviations.

Skeleton.—Only the bones of the cranium, nasal orifices, and lower jaw are present of the head. Neck and vertebral column are shortened ventrally and laterally (lordoskoliosa). A shoulder blade and shortened proximal bones were present in the limbs. There was a head without a face, no tail, and an abdominal fissure with ectopia cordis and shortening and curvature of the spinal column.

Of special interest is the fact that there was an ectoderm canal in the subcutis. The canal was formed by an opening in the neighbourhood of the shoulder and hip. It could only arise by folding in of the ectoderm and separation of the fold by growth of its edge (similar to the formation of the medullary tube in the young embryo). I think it arose at an early stage of fœtal life, probably at the time of arrested growth of the limbs.

(*Bericht König, Tierärzt. Hoch. zu Dresden.*)

PARAPHIMOSIS COMPLICATED WITH GANGRENE IN A DOG.

BY M. BARRAT, CHÂLOUS-SUR-MARNE.

A RUNNING dog, left at liberty with a bitch on heat, got paraphimosis. Three days after the accident, the general state of the subject was bad; appetite absent, intense thirst; penis hanging out and inert, its colour at certain points greenish and at others blackish; only the extremity of the urethra red. On touching, the organ was hard, insensible, and gave the feeling of a dry, leathery mass. The cause of the compression was behind the penial swelling; it was due to the preputial ring. The dog was put on his back; with forceps and scissors the mortified tissues were removed. The organ was thus reduced by one-third. The orifice of the prepuce was too narrow to allow the penial swelling to pass. The sheath was incised for a length of 5 cm., the penis returned, and the lips of the operation wound united by four sutures to hinder recurrence.

Bathing every four days was ordered, injections of carbolized water into the sheath, and a tonic *régime*.

At the end of fifteen days cure was complete; there remained only a slight abrasion of the sheath, the points of the sutures having given way.—G. M.

(*Revue de Toulouse ex. Le Bulletin Vétérinaire.*)

Abstracts and Reports.

NOTES ON INVERSION OF THE UTERUS.

BY MONSIEUR DAMÉCOURT, VETERINARY SURGEON, CAUMONT L'ÉVENTÉ (CALVADOS).

INVERSION of the uterus is a common accident of parturition, and there seems to be agreement on this head. An article by F. Saint-Cyr on bovine inversions says: "It is always at the furthest end of the organ, that is to say at the great cornu, that inversion commences." I can hardly agree with this; even the extremity of this great cornu is not visible. On the inverted mass one finds two orifices in which the afterbirth is inserted; one in the neighbourhood of the vulva and situated on one side (it is there that the non-gravid cornu is implanted on the body of the uterus); a second, at the summit of the inversion. The extremity of the cornu has thus preserved its normal disposition, and it has not caused or originated the course of the organ to the outside world. Comparative obstetrics furnishes me with an excellent argument. In the sow the two cornua are inverted one after the other; when the second commences to project it removes the borders of the first orifice from the body of the uterus to a higher position. In the hypothesis of F. Saint-Cyr the prolapse occurred at the summit of the first cornu and at the cervical extremity of the second. This objection seems sufficient.

Inversion of the uterus is produced in the same way as intestinal invagination; both are preceded by abnormal contractions of the muscular tunics, both are accompanied by colic. "Before anything appears externally," says Saint-Cyr, "the female shows uneasiness and anxiety; she stamps with her hind legs, whisks her tail about, and gets up and down frequently." Thus will I preface a very interesting case of this kind.

Observation.—(1) Norman half-blood mare affected with a bad consolidated fracture of the cotyloid cavity. She foaled in the night. At 8 o'clock in the morning the rectum alone was inverted for a length of about 50 cm. (15 in.). I reduced it without any difficulty, and injected about 6 litres of tepid water to straighten out the mucous membrane, no suture was employed. Some hours afterwards, rectum and uterus were everted and death followed.

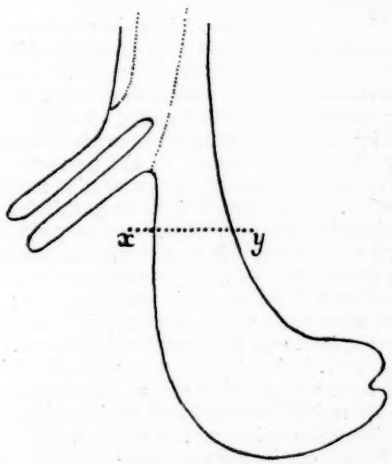
Prognosis.—Favourable in the cow, it becomes very grave in the mare, and she often dies before intervention occurs; very serious in the sow, whose narrow pelvic basin constitutes a real obstacle to reduction of an organ lined with an extremely delicate mucous membrane.

Causes.—The accident re-occurs at each time of parturition, indicating a predisposition in females so affected. Nevertheless the occasional and effective causes are unknown to us.

Treatment.—The technique by Schaack Guittard is excellent. But, against these authors, I consider that there should be no fomenting of an everted organ. Effect delivery and remove any bits of straw or *débris* from the mucous membrane; but do not employ any liquid, either tepid or antiseptic.

In order to convince you, pour a little tepid water on the excrements which soil the field of operation; the animal will immediately

make violent expulsive efforts with a renewed ejection of fæces. Exercise pressure to effect reduction, immediately the patient will oppose every movement you wish to make with all her force, the uterus is congested, voluminous hæmatomas raise up the mucous membrane, burst, and blood squirts out. On the contrary, if you try to return the organ cold without any lavage, expulsive efforts are reduced to a minimum, the uterus hardly bleeds at all, reduction is easy. Without knowing it you have effected antisepsis, for you have avoided traumatism, that is to say infection. The uterus is returned, your arm has pressed it back and unfolded it. Now is the time to make your irrigation. Do it abundantly with 40 to 50 litres of very hot salted water, 8 in 1,000; with your hand stir up this liquid in order to hold all foreign particles inside in suspension. The water is ejected as it enters; cease the injections when the outflow is clear. Apply afterwards a "Maison rustic" bandage, which is easily made; this precaution is useful and necessary, as the following observation proves.



(2) Normandy cow, aged 7. Calved alone and soon put out her uterus. Reduction easy on the recumbent animal. I did not put on a bandage, but the cow was taken with vitulary fever in the afternoon and I was called to treat her; the inversion had occurred again, in spite of the first absolutely perfect operation. At times in a meadow one finds a cow with an inversion of eight, ten, or twelve hours' duration. The beast seems greatly depressed, uterus is cold, strongly retracted, and contains no viscera. Operate as I have indicated; the result will be excellent, better than ever. But if the accident occurs in the farmer's presence you are sent for immediately. Generally in this case the uterus is enormous; it would be imprudent to await the aid of time. You must diminish the volume of the organ; employ Coculet's procedure or Esmarch's bandage. But if you neglect the preliminary time the work of reduction will be troublesome both

for the patient and yourself; you will wound the womb, and all subsequent care will not hinder death by gangrene.

You are called to a cow calved three days ago; she has not got rid of her afterbirth, in the morning she is found down with her womb out. Remove the afterbirth, but do not trouble if the cotyledons do not separate well; only take away what is not adherent. Abstain from fomentation. Put on Esmarch's bandage. It is necessary for this reason: the uterus gets beyond the vulva easily, and the neck of the uterus is very painful on account of the strain. Obtain strong compression; be certain you do not dilate the orifice, but diminish the mass that has to pass through it. Finish up with a good irrigation of oxygenated water, and that will be all that is necessary, for the bandage is superfluous.

In the mare the operation is more delicate: (1) The violent expulsive efforts present necessitate an anæsthetic, I believe, which one may neglect in the cow; (2) on account of the delicateness of the mucous membrane; (3) on account of the absence of cotyledons, which in bovines serve as props or stays.

If the accident occurs in a sow, failure is almost certain. Nevertheless try, before cutting off this enormous mass, which will probably be useless. Raise the hind part of the sow well, first of all return the second cornu into the body of the uterus, directing it towards the neck, which is very important, Notice in passing that the reduction of this cornu is effected by a reverse procedure to that employed firstly in the cow; it is a matter of the volume of the organ and calibre of the passage. Place Esmarch's bandage then at the summit of the first cornu near the vulva. Then unroll it with gentle but firm pressure, and the organ, reduced in volume, will enter the pelvic basin.

I believe (but I cannot apply it to a copious series of observations) that it must stop when the line *xy* of my schema is at the vulva. At this moment reduction should be made into the body; the arm of the operator cannot follow up the uterus to the end of its course, unfolding is necessarily incomplete, and re-inversion imminent. Finish as in the cow. But I repeat, I simply give the synthesis of ideas that these unfortunate cases have suggested to me, and they are legion.

Conclusion.—The technique employed varies with different species of animals, in each species it is a matter of the volume of the inverted organ and of the length of time the accident has occurred. Antiseptic irrigations are indicated after reduction only.—G. M.

(*Revue Générale de Médecine Vétérinaire.*)

RECENT ADVANCES IN VETERINARY KNOWLEDGE.[1]

BY DR. G. D. MCGILVRAY, V.S., MANITOBA.

RECENT years have been marked with many features of importance to the veterinary profession, and replete with many evidences of the steady advancement of veterinary science towards a higher plane, reflecting credit on both the profession and its adherents. The International Congress on Tuberculosis which met during the past

[1] Paper read before the Veterinary Association of Manitoba.

year at Washington, D.C., is deserving of passing notice. From abstracts to hand of this meeting, it was far-reaching in its scope and possibilities, and we can see that no efforts were spared by capable and worthy representatives of the profession in placing before that body of the world's greatest scientists many valuable contributions, dealing in a clear, lucid, and yet comprehensive manner with the problem of tuberculosis in its various phases, and the relationship between human and bovine tuberculosis.

The at least hasty, if not ill-considered, pronouncement of Koch a few years ago, suggesting a non-relationship between human and bovine tuberculosis, which at that time came in the nature of a "bombshell," and probably retarded more or less the work of combating this disease, has, however, stimulated other equally capable scientists to further research and investigation along lines hitherto neglected or taken for granted, and has resulted in acquiring and disseminating a more accurate knowledge and information of the many peculiarities of this disease and its causative agent, and, incidentally, as a result of which Koch himself has subsequently seen fit to at least modify his former views and expressions.

The relationship, therefore, between human and bovine tuberculosis being now clearly established and accepted, there still remains to be evolved some sane method and reasonable policy which might be accepted and adopted by veterinary sanitarians as a means of permanently combating and eradicating the disease from cattle herds with the least material sacrifice.

The recent appearance of foot-and-mouth disease among cattie in certain sections of the Eastern States was a genuine cause for alarm, and it is gratifying to know that, owing to the efficient and rigid quarantine restrictions maintained by the Health of Animals Branch, it was prevented from gaining an entrance into Canada. It is also worthy of favourable comment as to the activity displayed by the United States authorities, through its Veterinary Sanitary Service, in dealing with the various outbreaks, and the active measures employed for its speedy eradication.

The field of pathological and bacteriological science still affords fresh material for reflection. The ultra-visible nature of many specific infectious agents, and the possibility of certain others which are constantly present in the animal economy, and, under normal conditions, may be non-harmful, either in the nature of visible single or mixed infections, or ultra-visible agents and products, have apparently upset many formerly accepted beliefs. It is being demonstrated from time to time in certain diseases (as in the case of hog cholera), the causation of which has formerly been ascribed to a specific virus found always to be associated with such diseases, that after removal and elimination from the infective material of this specific virus by all present known methods, there still remains behind a filtrate, a something which, at present, is unable to be cultivated or demonstrated, but which nevertheless, when introduced into susceptible hosts, is capable of producing disease, while the specific virus itself may fail to do so. Here, within our own borders, we still have several apparently obscure, indigenous febrile conditions affecting horses, and which are not synonymous with those described or mentioned in veterinary textbooks, and would appear to be worthy of investigation as to their true nature and causation.

Veterinary therapeutics is rapidly being lifted out of the realm of empiricalism. The former, and too often practised, method resorted to of indiscriminately saturating patients with drugs of doubtful efficacy, crudely administered, is rapidly being replaced by a more intelligent selection of remedies and means of administration, and in this respect we should at least always avoid criticism of our methods of administratiou, even if, in some respects, our choice of remedies might be questioned. More attention is likewise being paid to hygienic conditions of sanitation and ventilation in their relationship to health. The germicidal action of the blood itself, through its alkalinity and phagocytosis, and the presence of opsonins, is being more clearly elucidated and understood, and remedies are now made use of in many cases as an adjunct to induce physiological effects and changes in the blood constituents, the relationship of which may have become changed during disease.

In biological products, which are from time to time being elaborated, we have before us the means of great possibilities in the diagnosis, prevention, and cure of diseases affecting the lower animals. In matters pertaining to public health, the veterinarian is becoming more and more recognized as an important factor and agent in safeguarding the public health from an unwholesome meat and milk supply. Many of the diseases of lower animals are directly transmissible in this manner to human beings, while others are largely disseminated in like manner.

While much has been achieved in recent years, there yet remains much to he accomplished. The work is large, and, after all, the labourers are few. Let us therefore not be weary in well doing and earnest endeavour, and if, individually, we may not be capable of accomplishing all that might be desired, let us however show our appreciation of the efforts of others, by at all times extending such help and co-operation as lie within our power.

In conclusion, let me extend to each and all a hearty welcome to our meeting, and trust that each may, from our presence here, gain from each other much that will be of benefit in our work, and depart with the feeling that our time has been well spent.

GLANDERS IN MEN.

In men this affection usually occurs if the virus discharged from the skin or mucous membrane gains access to the lymph-stream through the subcutaneous or submucous connective tissue, or is directly introduced into the blood-stream. But here it may be said that, although men frequently run the risk of contracting glanders during their employment, the occurrence of the disease is on the whole rare. Nevertheless, there is always the danger of an infection by way of the intestinal canal.

The illness may be acute or chronic. In acute cases a knot or a swelling arises at the seat of infection, and there is œdematous infiltration of the surrounding tissue, the lymphatic vessels, and the neighbouring lymphatic glands. Later there appear also in other portions of the body small knots and bluish-red pustules which develop

into swellings; purulent inflammation may arise in a single joint, and swelling of the body of the penis. Meanwhile there is feverish temperature, rigors, and the patient complains of violent muscular and joint pains. Often there is an ulcerous inflammation of the nasal mucous membrane, with a discharge of a secretion at first thin and later purulent, reddish, and tenacious, whilst there is coughing, hoarseness, difficulty in breathing and swallowing, indicating throat and lung implication. Gradually getting weaker, the patient dies in from two to six weeks.

In many cases (intestinal infection) the form of the illness is very similar to that of abdominal typhus, and only the continuance of fever over the third week and the occurrence of skin pustules clear up the true nature of the malady. The chronic form arises insidiously; accompanying a rise of temperature, and knots and little swellings arise in single portions of the body, and after their healing the patient may be well for months and years; but later fresh nodes arise, as well as appearances of inflammation of the lymph vessels and veins, till finally the process develops into the acute stage or runs a chronic course (in Bollinger's case the illness lasted fully eleven years). This form of the illness is, however, not common. Nominally in about 50 per cent. of cases under appropriate treatment (inunction of grey mercury ointment) cure results.

(Hutyra and Marek, "Spezielle Pathologie und Therapie, der Haustiere," vol. i., 1909.)

ANTHRAX IN MEN.

In men anthrax generally occurs as a local affection of the skin and of the subcutaneous connective tissue (carbuncle, pustula maligna, carbunculus malignus) in consequence of the entrance of the contagium through an injury in the skin. It affects chiefly those persons who are employed about sick and dead animals, such as veterinary surgeons, shepherds, butchers, horse-slaughterers, &c., and workers among animal skins, hair, brushes, or wool. In such occupations there is also the possibility of infection through inhalation of spores and the so-called "Hadernkrankheit," as well as wool-sorter's disease appears to arise in this way. Intestinal infection seldom occurs, since the flesh of anthraxed animals only contains bacilli, and these are destroyed by the gastric juice; besides, the virus is destroyed by the cooking of the flesh. Infection can only arise in this way if the meat is not subjected to a high enough temperature, or if diseased meat is used for sausages. Finally, flies may carry the infection.

The development of the carbuncle begins mostly with lancinating pains at the seat of infection, and a livid-red lump soon arises at this place. Later a blackish-red vesicle, filled with reddish serous fluid, arises. After this breaks the tissue begins to be destroyed, and new nodes and vesicles form in the neighbourhood. Round about, the subcutaneous tissue is much swollen in consequence of œdematous infiltration; it is very much stretched, and reddened as in erysipelas. Meanwhile general feverish signs arise, the infection becomes generalized, and the patient succumbs under septicæmic symptoms. Intestinal infection declares itself principally in violent, hæmorrhagic

enteritis, ushered in with intense abdominal pain, vomiting and rigors, until finally collapse and suffocation symptoms close the scene. Both forms can be combined, and after intestinal infection œdematous swellings may arise in different parts of the body. Infection by inhalation may give rise to acute pleurisy or broncho-pneumonia.

The localized carbuncle may be cured by timely surgical aid; immune serum in such cases, as also in the intestinal form, is sometimes effective.—G. M.

(Hutyra and Marek, "Spezielle Pathologie und Therapie der Haustiere," 1909.)

Reviews.

TEXT-BOOK OF MEAT HYGIENE. By Richard Edelmann, Ph.D., Royal State Veterinarian of Saxony. Authorized translation by John R. Mohler, A.M., V.M.D., Chief, Pathological Division, United States Bureau of Animal Industry, and Adolph Eichhorn, D.V.S., Assistant in Pathology and Bacteriology, Pathological Division. United States Bureau of Animal Industry, Washington: Published by George E. Howard Press.

The increasing interest manifested by the public concerning all phases of general hygiene has also extended to their food supply, and especially to meat. Having regard to this, to the fact that the necessity for a properly trained army of meat inspectors is becoming universally recognized, and to the fact that yearly increasing numbers of veterinarians are becoming engaged in this work, Drs. Mohler and Eichhorn have produced an English translation of the second edition of Professor Edelmann's "Meat Hygiene."

In the 389 pages of somewhat closely-printed matter which this book contains, much is to be found which should be of interest not alone to the meat inspector but to every veterinary surgeon. We have in it an opportunity of obtaining easily, and in a short space of time, an idea of the systems of meat inspection in vogue both in Germany and America, for Drs. Mohler and Eichhorn have freely inserted references to American methods where these differ from those adopted in Germany. In Germany much meat is annually saved by practising the so-called *freibank* system; this depends on the recognition by law of special places for the selling of meat of inferior quality. The meat is sold under declaration, namely, by stating the cause which makes the meat otherwise unmarketable. The purchase of such meat and its utilization by butchers, manufacturers of meat products, hotel and restaurant and boarding-house keepers is inadmissible and punishable. In connection with this are carried out the customary limitation of the sale of meat to small quantities in the *freibanks* and the official supervision of the entire *freibank* management.

The chapters on the various methods of conserving meat are good. The abnormal conditions and diseases of food-producing animals which render the carcases partially or totally unfit for the food of man, and the means best suited for the disposal of condemned parts, receive careful consideration. The effects of boiling, pickling, salting, and refrigeration on animal and vegetable parasites in meat are of great

importance in a country where the *freibank* system exists. Considerable attention is therefore bestowed on this question. Meat affected with *Cysticercus cellulosæ* may be eaten after thorough boiling, or after pickling for two or three weeks. It is pointed out that reducing the temperature of the meat 8° to 10° C. below zero is fatal to *C. cellulosæ*, but this is not a legally recognized method, In referring to glanders Edelmann states that "infection in solipeds occurs in most cases by way of the digestive apparatus; next in order through the abraded skin. The infection occurs rarely by way of the air-passages." Although many may be disposed to agree with him in his first assertion, we think infection through abraded skin should not be placed in front of infection by way of the lungs.

Under the head of "Intoxications and Auto-intoxications" are considered: Poisoning, cholæmia, uræmia, hæmoglobinæmia, and parturient paralysis. In referring to the latter, mention is made of the fact that the flesh of animals which have been treated by the injection of potassium or sodium iodide may acquire a peculiar stale odour and taste.

Post-mortem changes in meat are given a chapter to themselves, and so also are the following: Examination of prepared and preserved meat, chicken, game, fish, amphibia, and crustaceans, the history of meat hygiene, meat poisoning, and the management of abattoirs and stockyards.

The production of "Meat Hygiene" has certainly entailed great labour, and we think Professor Edelmann certainly did not expect too much when he expressed the hope that this edition might receive as favourable a reception as the preceding one. The printing and binding are excellent.—M. J.

OLIPHANT'S LAW OF HORSES. Sixth edition. By C. E. Lloyd. London: Published by Sweet and Marshall.

In the preface to this edition, Mr. Lloyd points out that the liability of hirer and lender of horses respectively has been the subject of several important cases in the Court of Appeal since the publication of the fifth edition, and these have necessitated very considerable alterations in, and additions to, the text. A number of cases involving the liability of the master for the negligent driving of his servant have been inserted. In the preparation of the veterinary section, which had become out of date in previous editions, Mr. Lloyd has been assisted by Mr. F. T. Barton, M.R.C.V.S. Cases relating to horses and cattle in Canada have been treated by Mr. C. Morse, D.C.L., Ottawa, and a digest of Canadian statute law appears in the form of an Appendix.

Part III. of the original work, in which racing, wagers, and gaming were considered, has been omitted from this edition, the reason given for excluding this being that in the opinion of the editor the law relating to gaming and wagering would, in its present state of development, be more appropriately dealt with in a separate treatise than in a book the chief object of which is to give an exposition of the law as applied to horses.

Taken on the whole, it is a work which might with advantage find a place among the books of everyone much connected with horses and horse-dealing. Concise definitions of the various diseases which

constitute unsoundness would certainly be useful, and we think preferable to the rather rambling semi-pathological, semi-clinical consideration which they receive, which is, moreover, in places neither correct nor in line with present-day views.—M. J.

AGRICULTURAL JOURNAL OF THE CAPE OF GOOD HOPE.

THIS Journal for January contains an illustrated article on "The Construction of Pig-stye Buildings" and a paper by Mr. H. Watkins Pitchford, F.R.C.V.S., F.R.S.E., on "Horse Sickness and its Prevention." Mr. Pitchford, towards the end of his article, writes: "For some time past I have been coming to the conclusion that it would be through the young animal—the foal—and not by treatment of the adult horse that they would solve the question of South African horse sickness." His reasons for thinking so were; (1) The foal tolerates experimental inoculation better than the grown horse. (2) Natural immunity or tolerance much greater than that of the horse. (3) No signs in foals that reacted of undesirable symptoms, such as shortness of breath, &c. (4) Resistance produced at this age is akin to resistance of horse born and reared in a sickly district. He was at present unable to state how long the foal would retain its immunity.

The Points of Merino Sheep, Importation of Thoroughbreds, and Poultry Diseases are also dwelt upon in the Journal.—G. M.

SPEZIELLE PATHOLOGIE UND THERAPIE DER HAUSTIERE. Vol. ii. By Dr. Franz Hutyra and Dr. Joseph Marek, Budapest. Published by Gustav Fischer, Jena.

The second volume of this work opens with diseases of the nasal cavities and air spaces of the head. Among animal parasites that affect the nose, œstrus ovis, pentastoma tænioides in dogs and coccidian disease of rabbits are noticed. Diseases of the larynx comprise catarrh, croupous laryngitis, and œdema glottidis; and among tumours found in the larynx may be mentioned fibroma, lipoma, carcinoma, melanoma, and lymphosarcoma. Hyperplasia of the mucous membrane of the larynx may occur in chronic laryngeal catarrh. Bronchial catarrh, bronchostenosis, verminous bronchitis, and bronchial asthma are all fully described. Lung affections get their full share of space and are well dilated on. It may not be generally known that tumours which may affect the lungs are carcinoma and adenocarcinoma in dogs, sarcoma and melanosarcoma ln horses, and through metastasis fibroma, chondroma, lipoma, osteoma, and dermoid cysts, and in horses botryomycoma. Diseases of the pharynx and œsophagus take up 40 pages, and in the latter organ conditions not always differentiated by the practitioner comprise œsophagitis, œsophagismus, paralysis, obstruction, stenosis, dilatation, and tumours.

The tome is especially strong on diseases of the stomach and intestines, and in connection with indigestion and acute dilatation of the former Marek has used his stomach pump very successfully, and records eighty-one recoveries out of eighty-five horses treated in his clinique. In connection with acute dilatation of the stomach, it may be interesting to note that the author writes: "The symptoms of primary acute stomach dilatation usually appear in the first four, and very exceptionally after the seventh hour from partaking of food." Parasitic colic and coccidiosis intestinalis occupy 31 pages. Diseases of the liver

("fluke" well discussed), peritoneum, brain, and spinal marrow follow. Peripheral and functional nerve diseases are dealt with in two sections, and milk fever and Schmidt's treatment come in here under paresis puerperalis. It is recognized by Marek from many reliable statistics that the mortality rate from this auto-intoxication of the cow has declined from 40 per cent. to 10 per cent. since the advent of the udder treatment. Eclampsia is ascribed to a neurosis.

Skin diseases take up 150 pages, and conclude the work. The illustrations in this part of the book are of great interest to the general practitioner, and the picture of the cat's head with sarcoptic mange and the fowl's leg affected with dermatoryctes mutans are especially worthy of observation. For the treatment of *acariasis* it is recommended that the hair of dogs be shaved or clipped off, the pustules slit with a knife, and their contents pressed out. Continental men use salicylic ointment, alcoholic solution of creolin or ichthyol, or carbolic acid ointment. Formalin paste, too, has a vogue, made as follows: Formaldehyde, 1 to 3 parts, vaseline, 50 parts, zinc oxide and starch flour, āā 25; tincture of iodine, petroleum on half the body, 2 to 2½ per cent. carbolic acid injections, and a mixture of ol. carui and spirit āā 10 parts, with ol. ricini 150 parts, are among other agents recommended.

Throughout both volumes of this work the diseases of poultry receive prominent attention, and many pages are taken up with their symptoms, course, and treatment. Scientific men in Germany do not leave all the writings on fowls to laymen.

It is a pleasure to the reviewer to state that the names of McFadyean, Penberthy, and Hobday frequently appear in the record of the literature consulted. In our land, where research is unworthily encouraged financially, this is gratifying. It shows how some of the foremost men in the profession keep the flag flying over *Investigation* although lacking adequate support and encouragement.—G. M.

A CORRECTION.

In the review of "Spezielle Pathologie und Therapie der Haustiere," vol. i., which appeared in the Veterinary Journal for March, the statement appears that "Rickets is discussed under the heading of 'Rachitis,' which ought to be altered." In the work under review the word reads "Rhachitis," and it was to the spelling of that word that our reviewer referred, as too many h's are as bad as too few. The mistake occurred during proof-reading.—Ed. *V.J.*

THE INTERNATIONAL CONGRESS ON TUBERCULOSIS.

The British delegates to the above Congress at Washington have presented their report, which is both interesting and instructive. Thirty-three different countries were represented at the Congress, and the resolutions unanimously adopted at the closing session included the following:—

(*a*) That the attention of the States and Central Governments be called to the importance of proper laws for the obligatory notification by medical attendants to the proper health authorities of all cases of tuberculosis coming to their notice, and for the registration of such cases in order to enable the health authorities to put in operation adequate measures for the prevention of the disease.

(*b*) That the utmost efforts should be continued in the struggle against tuberculosis, to prevent the conveyance from man to man of tuberculous infection as the most important source of the disease.

(*c*) That preventive measures be continued against bovine tuberculosis, and that the possibility of the propagation of this to man be recognized.

Touching on the educational campaign against the disease in the United Kingdom, which has already had much success, the delegates pay a tribute to the good work which is being done in Ireland under the auspices of Lady Aberdeen and the Women's National Health Association. The awakening of the Irish people to the necessity of taking action was one of the features revealed at the Congress.

In conclusion, the delegates strongly commend the resolutions of the Congress to the consideration of His Majesty's Government and of the local authorities of the United Kingdom.

UNIVERSITY OF LONDON.

The following gentlemen have been appointed Staff Examiners (External) for the Science Degree (Veterinary Science) for 1909-10: Veterinary Anatomy: O. Charnock Bradley, D.Sc., M.D., M.R.C.V.S.; Veterinary Pathology: William Bulloch, M.D., C.M.; Veterinary Physiology: Professor W. D. Halliburton, M.D., LL.D., B.Sc., F.R.C.P., M.R.C.S., F.R.S.; Veterinary Hygiene: Stewart Stockman, M.R.C.V.S.

Appointment of a Royal Commission.

The King has been pleased to appoint a Royal Commission on the subject of University Education in London.

The terms of the reference are: "To enquire into the working of the present organization of the University of London, and into other facilities for advanced education (general, professional, and technical) existing in London for persons of either sex above secondary school age; to consider what provision should exist in the Metropolis for University teaching and research; to make recommendations as to the relations which should in consequence subsist between the University of London, its incorporated colleges, the Imperial College of Science and Technology, the other schools of the University, and the various public institutions and bodies concerned; and further to recommend as to any changes of constitution and organization which appear desirable. In considering these matters, regard should also be had to the facilities for education and research which the Metropolis should afford for specialist and advanced students in connection with the provision existing in other parts of the United Kingdom, and of His Majesty's Dominions beyond the Seas."

The Chairman of the Commission is the Right Hon. R. B. Haldane, K.C., M.P., and the members are: The Right Hon. Viscount Milner, G.C.B., G.C.M.G.; the Right Hon. Sir Robert Romer, G.C.B.; Sir Robert L. Morant, K.C.B.; Mr. Laurence Currie, M.A.; Mr. W. S. M'Cormick, M.A., LL.D.; Mr. E. B. Sargant, M.A., and Mrs. Creighton.

The Joint Secretaries to the Commission are Mr. J. Kemp and Mr. H. F. Heath.

Personal.

FAREWELL DINNER TO MR. GILRUTH.

On Tuesday, January 5, a representative gathering of members of the profession entertained Mr. Gilruth at a farewell dinner, he having resigned his position as Principal Veterinary Officer to the New Zealand Government to take up his appointment as Professor of Pathology at the new Veterinary School to be founded in connection with the University of Melbourne. The dinner was held at Wellington, and was attended by the Prime Minister of the Dominion (Right Hon. Sir J. G. Ward, K.C.M.G.) and a number of members of the profession.

In proposing Mr. Gilruth's health, Mr. Reakes, who presided, said: "Gentlemen, you are all aware of the reason we have met here to-night; and while our enjoyment of our guest's and each other's society is naturally tinged with the regret, we feel in the fact that Mr. Gilruth is leaving our country, yet he knows that we feel, as fellow-members of his profession, the keenest pleasure and pride in the fact that he has been called to so important a position as that of Professor of Pathology at the new Veterinary School to be founded in connection with the University of Melbourne. You will agree with me that ever since Mr. Gilruth came to New Zealand he has worked most strenuously for the advancement of the profession. By his good work and personal example Mr. Gilruth has done much to make the qualified veterinary surgeon appreciated by the New Zealand stockowner, so that this country now offers a good field for the capable private practitioner. During his fifteen years here, Mr. Gilruth has built up the Veterinary Division of the Department of Agriculture, and under his direction the Division has gone ahead by leaps and bounds, and now includes in its staff no less than twenty-six qualified veterinary surgeons, under whom are working a large number of lay assistant inspectors. Perhaps one of the greatest regrets Mr. Gilruth will feel in leaving New Zealand will be that his strenuous endeavours to obtain legal protection for the veterinary surgeon have not as yet been successful. It is still possible for any individual in this Dominion who possesses sufficient impudence to style himself a veterinary surgeon, and to advertise himself as a member of the Royal College. You know how earnestly and frequently Mr. Gilruth has striven to have this righted, and we all trust that his efforts may even yet bear fruit in the near future. In his capacity of Chief Government Veterinarian, Mr. Gilruth has shown great administrative ability. It was largely due to his efforts that the Slaughtering and Inspection Act was passed, and as a result a large proportion of the people of this Dominion now have the benefit of a properly inspected meat supply; and what is more, and possibly even of greater monetary value to this country, by the system of inspection (inaugurated by Mr. Gilruth) of all meat intended for export, the British consumer has a guarantee of purity which I am personally well aware is accepted by those who control the frozen meat business in Great Britain as being thoroughly reliable. But our guest's talents have not only been exerted in administrative work. As an investigator, and in research work, he has made a deservedly great reputation for himself. When he came here stockowners suffered

heavy losses through what may be termed preventable diseases—such as parasitic diseases, malignant œdema, congestion of kidneys in lambs, braxy-like disease among hoggets, "Winton" disease, *ante-partum* paralysis, and so on. Now, as a result of his investigations and the dissemination of the knowledge gained, losses from these troubles are reduced to a minimum. In addition to the diseases I have mentioned, he can congratulate himself in having succeeded in stamping out swine fever; and blackleg, that at one time seemed likely to assume serious proportions, is now thoroughly under control. Tuberculosis is still with us, but you know, gentlemen, that the means for attempting to control this disease have not been afforded Mr. Gilruth, so that he cannot be held in any way responsible. As a bacteriologist and pathologist Mr. Gilruth stands pre-eminent in New Zealand—in fact,, one may well say, in Australasia. Most of you know what good work he did when there was a slight outbreak of bubonic plague in this country some eight or nine years ago, and afterwards as pathologist to the Public Health Department. We are all pleased that Sir Joseph Ward has done our guest and our profession the honour to be with us to-night; and he, as the first Minister for Public Health in the whole of the British Empire, will, I believe, bear out my assertion that the very creation of that most important department was in no small degree due to Mr. Gilruth's investigations and recommendations. And now, gentlemen, with the memory of all the good work he has done here, need I say we are absolutely certain Mr. Gilruth will do great work in Australia? I look forward to the Melbourne College turning out graduates equal in knowledge and professional capacity to any in the British Empire. We all join in wishing our guest every success in his new sphere. He knows that in his departure from here he takes with him the good wishes of every member of the profession in the country. I ask you to join with me in drinking health, long life, prosperity, and all happiness to Mr. Gilruth."

The toast was drunk with musical hononrs.

In reply, Mr. Gilruth entertained the company with many reminiscences of earlier days in the service of the Dominion. Speaking in regard to any good work he had been able to do in New Zealand, he paid a warm tribute to the whole-hearted loyalty of his professional staff, the members of which he had always regarded, and always endeavoured to treat, not as subordinates in any way, but as colleagues. He complimented the staff on the appointment of Mr. Reakes as his successor, who he was certain would receive from every brother professional the loyalty he (Mr. Gilruth) had received; and he was equally certain there was nothing Mr. Reakes could do to benefit the profession, or any individual member of it, which he would not do with all his might. He looked forward with much interest to his new work, and had some hope that the Melbourne College might prove of service to New Zealand in the training of professional officers for the service of the Dominion. They would know there was no affectation about his words if he said that, while he was leaving New Zealand with high hopes for his new sphere, he felt very keen regret at the severance of so many friendships within the Dominion which had become of no little moment to him and his.

PROFESSOR GEO. H. WOOLDRIDGE has been elected a Member of the Royal Irish Academy.

DR. J. WELCH, Roland, has been elected President of the Veterinary Association of Manitoba for the coming year in succession to Dr. C. D. McGilvray.

MR. LOUDON M. DOUGLAS, who conducted a course of instruction during the past winter at the College of Agriculture, Edinburgh, has been appointed to give a series of lectures at the Royal Society of Arts, London, during next winter, on the subject of the meat industry. The lectures will be given under the Cantor Scheme, and will be open to all who are interested in this subject.

OBITUARY.

WE regret to note the death of Mr. Thomas Wakley, the Editor of the *Lancet*, at the age of 57. Mr. Wakley was a grandson of the late Thomas Wakley, M.P., the founder of the *Lancet*. He was educated at Westminster School, Trinity College, Cambridge, and St. Thomas' Hospital. He was a Licentiate of the Royal College of Physicians, a Fellow of the Royal Society of Medicine, Member of the London Medical Society, &c. The VETERINARY JOURNAL has frequently been under an obligation to Mr. Wakley for his kind permission to reproduce articles from the *Lancet*.

Translations and Extracts.

INFECTIOUS ABORTION OF COWS.

BY DR. NUESCH, FLAVYL (*Schweizer Archiv für Tierheilkunde*, 1908, vol. v.).

DISTRICT Veterinary Surgeon Brauer, of Saxony, recommended subcutaneous injection of 2 per cent. carbolic water for abortion. This was not very opportune in practice. Nuesch advocates the internal use of carbolic acid for the complaint. He gave for several days 1 to 1½ litres (about 1¾ to 2½ pints) of a 1 per cent. solution of carbolic acid to a cow about thirty weeks pregnant. She showed oppressed pulse, high temperature (40° C.), and all the symptoms of impending abortion. The bad signs declined, and at the end of pregnancy a healthy calf was born. Afterwards he treated twenty pregnant cows which had been in contact with aborters on three large farms. The affected animals all had more or less discharge. The animals that had pitched their calves were put on one side of the shed, and the pregnant cows on the other. The standings and the genitals of all the animals were disinfected with creolin solution. All of them received, for five to ten days, 1 to 1½ litres of a 1 per cent. carbolic acid solution. No bad effects were noticed, and no further cases of abortion occurred, and twice since many of the cows have calved normally. Those animals that had aborted were treated with phenol, and no further case occurred. Nuesch hopes to give further accounts and proofs of the use of the drug.—G. M.

(*Zeitschrift für Veterinärkunde.*)

THE DEVELOPMENT OF ASCARIDES IN THE HORSE.

This question is still little understood, despite the works of Dieckerhoff, Marek, Hutyra, and Schneider; one does not know for certain what are the phases of development undergone by the eggs of *Ascaris megalocephala*, but one knows more about the parasite which affects man, *A. lumbricoides*. The dung of infected animals contains the eggs of the parasite. One sees them in a little matter diluted with water and examined under a low power. The eggs are round or slightly oval if they are dried; their diameter is 80 μ on an average. They are enclosed by three membranes: an internal, slender, wrinkled one; a middle, thick, homogeneous, transparent one; and an external one of variable thickness; its membrane is albuminous. This is colourless in the uterus of the female, or at the moment of laying; but it soon becomes greyish-yellow in the intestines of the host and loses its transparency; the egg is then opaque. The transparency may be restored to it by the action of an extended washing with potash. The eggs are often isolated. They only show at the most in fresh dung the first stages of development. This development of the eggs depends on certain conditions, which are the same for all nematodes. In general eggs contained in damp dung and at the ordinary temperature develop in twenty-four to thirty days. If one keeps them at an artificial temperature of 37° C., the humidity being maintained, development takes place in three to four days. Oxygen is indispensable; light is injurious and hinders development; however, if development has commenced, it does not arrest it. In water, development is arrested very slowly; the egg undergoes maceration and changes character. The same phases of development of the egg of *A. megalocephala* occur in all nematodes. The egg of the ascaris is easily distinguished from the eggs of other helminths, and particularly from the sclerostome, which is quite elliptical and enveloped with a very fine membrane. It has, besides, this other characteristic, that the embryo even completely developed never leaves its membrane outside the body of the host. The author has been able to preserve it for six months without it hatching, and he has never encountered the embryo free in the midst of the eggs in the dung. However, one easily obtains the issue of the embryo by lightly compressing the eggs; the membranes split, the inside comes out and projects the embryo, whose length measures about 30 mm. and diameter 2 mm.

In agreement with Railliet, Albrecht believes in the uselessness of an intermediary host. The embryos develop in the straw, and the damp dung is ingested, then encapsuled by the animals. But the egg-walls alone can assure the continuity of the evolutive circle; the eggs ingested fresh are incapable of undergoing their evolution in the body of the host on account of the failure of oxygen. They traverse the digestive tube without freeing themselves from embryos. The best anthelmintic to oppose *A. megalocephala* is tartrated antimony, according to Albrecht. Turpentine mixed with castor oil gives equally good results.

(*Ex Revue Générale de Médecine Vétérinaire.*)
(*Zeitschrift für Veterinärkunde.*)

OCCLUSION OF THE VAGINA.

BY DORN.

THE author has observed this affection three times in heifers.

(1) An animal, aged 2, had difficulty in urinating. The vagina was completely obstructed, save for a small opening which allowed a little pus to escape. Rectal exploration showed that the uterus was as voluminous as in a cow four months pregnant. She had never been covered. Puncture with a trocar gave exit to a large quantity of pus. The opening was enlarged with the hand, and cure resulted after antiseptic injections.

(2) A heifer, aged 18 months, had been straining for some days after being covered. Fifteen days later she lost appetite, and made water with difficulty. Temperature, 40·87° C. The hand penetrated with trouble into a very narrow vagina in the form of a tunnel. The uterus was so voluminous that its anterior extremity could not be felt. No vaginal discharge. The finger forcing a narrow passage up the vagina caused the exit of dark, bad-smelling liquid. Same treatment as previously. Cure.

(3) After being jumped, a heifer, aged 21 months, showed slight vulval hæmorrhage. Eighteen days later she lost appetite, without being feverish. The hand was arrested 10 cm. from the vulva. Uterus voluminous, full of liquid. The septum perforated with the finger, and opening enlarged with the hand. Discharge of dark and fœtid liquid. Same treatment, and cure.

Etiology of the first case unknown; covering the cause of the two others. During coitus wounds were produced, followed by inflammation, swelling, and subsequent obstruction of the vagina, inflammatory products of the uterus accumulating behind the obstacle.

(*Revue Générale de Médecine Vétérinaire.*)

MASTOIDITIS IN A HORSE.

BY KINSLEY (*American Veterinary Review*).

A HORSE, as the result of a blow, had an abscess of the ear. At the end of two months he presented the following symptoms: the head was turned to the right, the right ear was pendent, a little pus of bad odour was discharged by the auditory canal; the right eye was projected, the lips and the muscles of the right side of the face were paralyzed, the gait was uncertain, temperature, respiration, and circulation were normal; appetite was good, but the prehension of food troublesome.

The diagnosis was mastoiditis, possibly extending to the internal ear. The fallopian aqueduct, which carries the facial nerve, being very near the mastoidean cells, it is probable that inflammation of these cells would produce sufficient pressure on the facial nerve to bring about paralysis of the lips and muscles of expression. An old inflammation of the middle ear may lead to disarticulation of the bones, and the trigeminal and glosso-pharyngeal nerves may become compressed, and bring about paralysis of the tongue and lower lip. Pressure on the origin of the motor nerves of the eye can cause

paralysis of the motor muscles of the eye, and push the eye forward. The uncertain gait was, perhaps, due to pressure on the cerebellum, or to a lesion of the semi-circular canals. The horse, which was killed, showed at the autopsy extending necrosis into the middle ear; the ossicles, their muscles, ligaments and mucosa had disappeared; the mastoidean cells were enlarged; the petrous temporal disarticulated, the internal ear only slightly affected.

(*Revue Générale de Médecine Vétérinaire.*)

STATISTICS OF DISTEMPER.

BY WIRTH.

At the clinique of the Veterinary College of Vienna, 12,000 dogs have been treated from 1901 to 1906; 2,855 have had the distemper, about 1 in 4. The statistics show that breed exercises no influence on the number of the invalids, but that the affection is graver in certain dogs than others. Thus, while the general mean of unfavourable cases (non-cure and slaughter) is 43·6 per cent., it falls to 35·8 per cent. for fox terriers, aud rises to 64·2 per cent. for greyhounds. Bitches are more predisposed to the nervous forms than dogs—20·4 per cent. as against 13·9 per cent. The mortality in young dogs is greater than in adults. Nine cats had the disease—five cures, one partial recovery, three deaths. None had nervous trouble.

(*Revue Générale de Médecine Vétérinaire.*)

Books and Periodicals, &c., Received.

"Common Colics of the Horse," by H. C. Reeks, F.R.C.V.S., second edition, Baillière, Tindall & Cox (5s. net); Transvaal Agricultural Journal; Journal of the Royal Army Medical Corps; Twenty-fourth annual report of the Bureau of Animal Industry; Third report of the Wellcome Research Laboratories, Khartoum (Baillière, Tindall & Cox, 21s. net); Review of Recent Advances in Tropical Medicine, supplement to the Third Report of Wellcome Research Laboratory (Baillière, Tindall and Cox, 10s. 6d.); Annual Report of the Burgh Veterinary Inspector for Greenock; Text-book of Meat Hygiene (Edelman); Second Annual Report of the Live Stock Sanitary Board, N.D.; University of London Gazette; Dick College Magazine.

Letters and Communications, &c.

Mr. J. G. Rutherford; Mr. J. D. Pottie; Mr. T. Wilson; Dr. Lauder; Mr. Raleigh; Mr. Mayall; Dr. Braund; Dr. McGilvray; Mr. P. M'Intyre; Mr. L. M. Douglas; Dr. Williams; Board of Agriculture and Fisheries; Department of Agriculture and Technical Education for Ireland; The *Lancet*.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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